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9 August 1990

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W.O. #2994-02-03

RE: Stabilization Processes Evaluation
EKCO Housewares, Inc.

Dear Mr. Vandermeer:

At the direction of American Home Products, WESTON is submitting two (2) copies of the technical report for the "Evaluation of Stabilization Processes for Closure of the Surface Impoundment at the EKCO Housewares Facility". This report is the result of an agreement reached between OEPA and Timothy McGuinness of American Home Products.

The report also is in response to the OEPA request for additional supporting data on the proposed EKCO surface impoundment closure activities. As you are aware, extensive dialogue has taken place since early 1988 regarding closure activities at the EKCO facility. During that time period, American Home Products produced the:

- Groundwater Quality Assessment Plan - March 1988
- RCRA Closure Plan for EKCO Housewares - August 1988
- Quality Assurance Management Plan - September 1988
- RCRA Post-Closure Permit Application for EKCO Housewares - December 1988
- Test Plan to Evaluate Stabilization Processes for Closure of the Surface Impoundment - December 1989
- Groundwater Quality Assessment Report - January 1990

This June 1990 Evaluation of Stabilization Processes Report supports the closure methodology described in the August 1988 Closure Plan. Specifically:

- All vendor mixtures met the TCLP treatment standards for F006 BDAT requirements as specified in 40 CFR Part 268.
- The TCLP metals concentrations were all less than the MCL.



- Reasonably low permeabilities of less than 10^{-5} cm/s were attained by all mixtures (Table 3-5).
- The VOC and TCLP VOC concentrations measured in the untreated soil (sludge) were insignificant and are not expected to affect the full-scale stabilization process.

American Home Products and WESTON are available to meet and discuss any questions you might have about closure activities at the EKCO facility. If there are any additional questions or comments, please do not hesitate to contact Mr. Kevin Krause at (212) 878-5092 or Mr. H. G. Byer at (215) 344-3643. Thank you for your continued interest in this project.

Very truly yours,

ROY F. WESTON, INC.

A handwritten signature in cursive script that reads "Harold G. Byer, Jr.".

Harold G. Byer, Jr.
Project Manager

HGB/lam

cc: M. N. Bhatla
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**Evaluation Of Stabilization Processes
For Closure Of The Surface Impoundment
At the EKCO Housewares, Inc.
Massillon, Ohio Facility**

DRAFT

June 1990





EVALUATION OF STABILIZATION
PROCESSES FOR CLOSURE OF
ABANDONED SURFACE IMPOUNDMENT

EKCO HOUSEWARES, INC.
MASSILLON, OHIO

June 1990

DRAFT

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SECTION 1

INTRODUCTION

1.1 BACKGROUND

The surface impoundment at the Massillon, Ohio, facility contains soils and sludges contaminated with cadmium, chromium, and lead. Table 1-1 presents the range of metals concentrations in the waste material. Table 1-1 also presents the results of a limited number of samples analyzed by the EP Toxicity test procedure (40 CFR Part 261, Appendix II) and the total metals concentrations found in these samples. Of five samples analyzed by the EP Toxicity test procedure, two contained cadmium concentrations greater than the Maximum Contaminant Level (MCL) 1 mg/L limit for the characteristic of EP Toxicity (40 CFR Part 261.24(b)). Figure 1-1 contains a site map showing the abandoned surface impoundment in the northwest section of the site.

The closure method selected for the surface impoundment is to close the unit as a disposal impoundment meeting the requirements of a landfill closure. The closure of this unit will include stabilization of sludges and soils and covering the stabilized material with a multilayer cap system consisting of soil and synthetic liner material.

This document is being submitted in response to OEPA's request for a treatability study. It presents an evaluation of various stabilization techniques and processes and the procedures that were used to assess the adequacy of the proposed treatment. Roy F. Weston, Inc. (WESTON) was retained to develop and oversee the treatability study. The treatability study was conducted in accordance with a Test Plan, which was submitted to OEPA in December 1989 and approved in January 1990.

1.2 OBJECTIVES

The objectives of the treatability study were to develop a stabilization formulation with the following characteristics:

- Unconfined compressive strength greater than 50 psi after a 28-day cure.



Table 1-1

Range of Metals Concentrations Present in
Surface Impoundment Soils and Sludges

Constituent	Total Metals ^a (mg/kg)	Total Metals ^b (mg/kg)	EP Leachate (mg/L)	Maximum Concentration for Characteristic of EP Toxicity ^c (mg/L)
Cadmium	<0.369-8,320	11-4,500	0.09-2.0	1.0
Hexavalent Chromium	NA	NA	All <0.02	NA
Total Chromium	4.44-880	18-150	All <0.02	5.0
Lead	13-24,000	520-11,000	0.08-0.52	5.0

^aResults of WESTON sampling described in the "Draft RCRA Closure Plan for EKCO Housewares, Inc., Massillon, Ohio," WESTON, August 1988.

^bResults of Wadsworth Testing Laboratories, Inc. sampling described in "Draft RCRA Closure Plan for EKCO Housewares, Inc., Massillon, Ohio," WESTON, August 1988.

^c40 CFR 261.24(b).

NA = Not applicable for hexavalent chromium analysis.

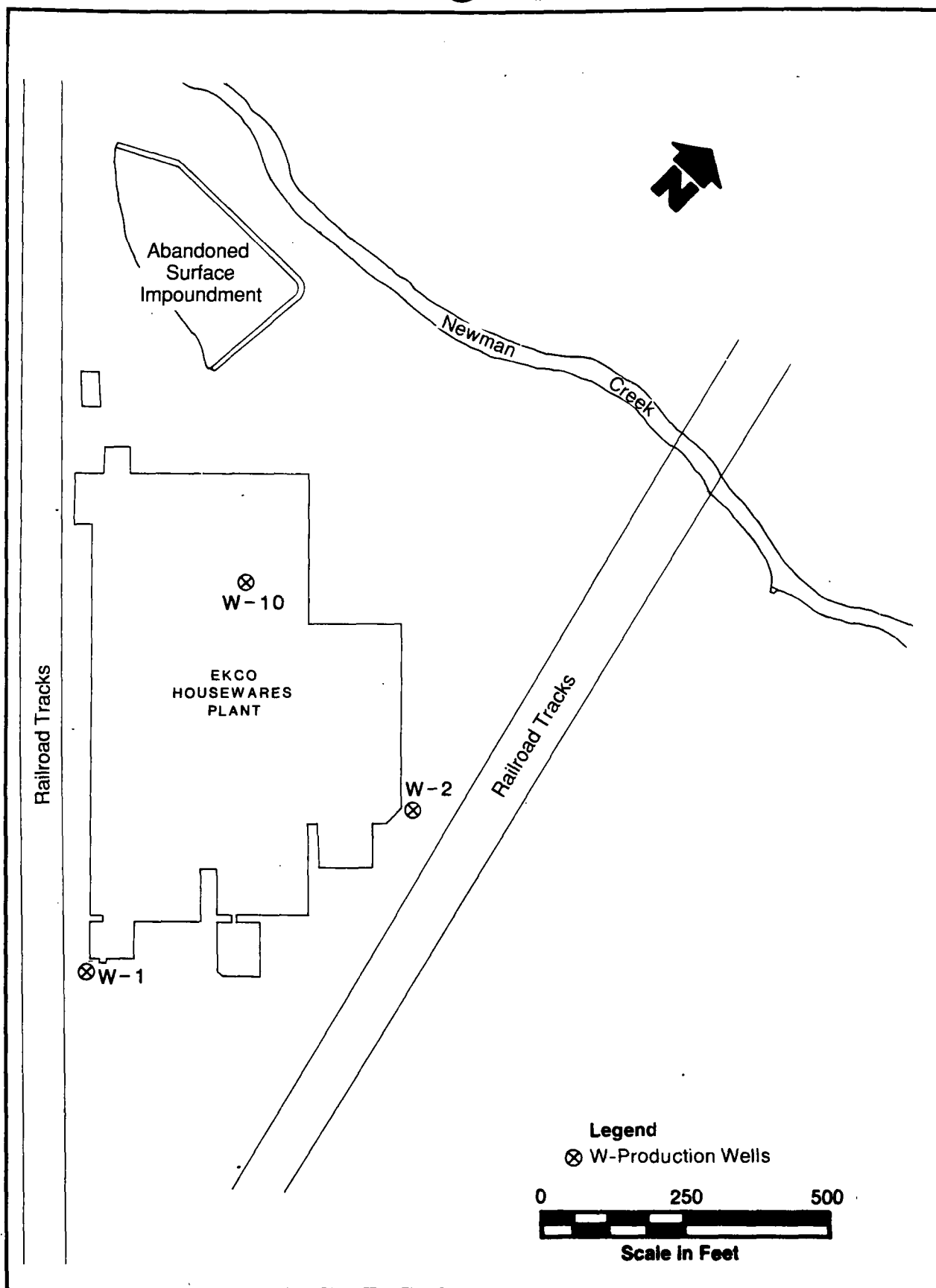


FIGURE 1-1 SITE DIAGRAM OF EKCO HOUSEWARES, INC., MASSILLON, OHIO

- Low permeability.
- Meet U.S. EPA Best Demonstrated Available Technology (BDAT) treatment standards for F006.

1.3 SCOPE

Several stabilization processes and vendors were selected for treatability testing by EKCO and WESTON. The following three vendors were selected based on a technical evaluation of each vendor's process chemistry, costs, and qualifications and experience:

- Enreco, Inc. (Enreco) of Cincinnati, Ohio.
- Harmon Environmental Services, Inc. (Harmon) of Plymouth Meeting, Pennsylvania.
- Silicate Technology Corporation (STC) of Scottsdale, Arizona.

In addition, WESTON prepared a formulation to develop baseline conditions using cement kiln dust. All these vendors and WESTON were supplied with portions of the same composite sludge/soil sample to develop their stabilization formulation.

Vendors forwarded samples of their final proposed formulation(s) to WESTON for evaluation. WESTON tested these samples to determine if they met the physical and chemical performance objectives of the study.

The physical and chemical tests that were conducted by WESTON on the vendors' formulations and the WESTON baseline formulations included:

- 28-day unconfined compressive strength (UCS).
- Triaxial permeability.
- EPA Toxicity Characteristic Leaching Procedure (TCLP) metals and volatile organic compounds (VOCs).
- Bulk density.
- Moisture content.

Physical and chemical characterization of the untreated sludges and soils was also conducted by WESTON. These tests included:

- EPA TCLP metals and VOCs.

- Bulk density.
- Moisture content.
- Grain size distribution.
- VOCs.

The sludges and soils used for these tests were collected from those areas of the lagoon having high concentrations of metals as found in previous site investigations (see Table 1-1 for references) and were combined and mixed before being used for testing, as detailed in Section 2 of this document.

SECTION 2**TREATABILITY STUDY****2.1 OVERVIEW**

The treatability study was performed according to the Test Plan dated December 1989. Samples of lagoon sludges and soils were collected by WESTON in January 1990 from areas of the lagoon potentially containing high contaminant concentrations (i.e., metals and VOCs), and were mixed onsite as described in Subsection 2.2. Sampling locations were based on the results of previous soil boring studies (see Table 1-1 for references).

The treatability study was conducted from February through May 1990. The mixed untreated material was analyzed for the physical and chemical characteristics detailed in Subsection 2.4.1. Portions of the mixed sample were shipped to vendors for treatability testing. Treated samples were returned to WESTON for the physical and chemical analyses described in Subsection 2.4.2.

2.2 SAMPLE COLLECTION

Samples of lagoon sludges and soils were collected from locations near previous soil borings that indicated high concentrations of cadmium, chromium, and lead. Lagoon sludges and soils were collected in the 0 to 4-foot range of selected previous soil boring location BSB-5 and in the 0 to 2-foot range of selected previous soil boring location SSB-1. Based on previous studies, approximate sampling locations are shown in Figure 2-1.

The 0 to 4-foot range of location BSB-5 had the highest cadmium and lead concentrations observed in the lagoon, and the 0 to 2-foot range of SSB-1 had the highest chromium concentration observed in the lagoon based on previous studies. For this study, approximately 40 percent of the total sample volume was collected from location SSB-1. Equal amounts of material from the 0 to 2 and 2 to 4-foot depth intervals of location BSB-5 made up the balance of the sample. The composite of these soils at this ratio gave a worst case soil to be treated.

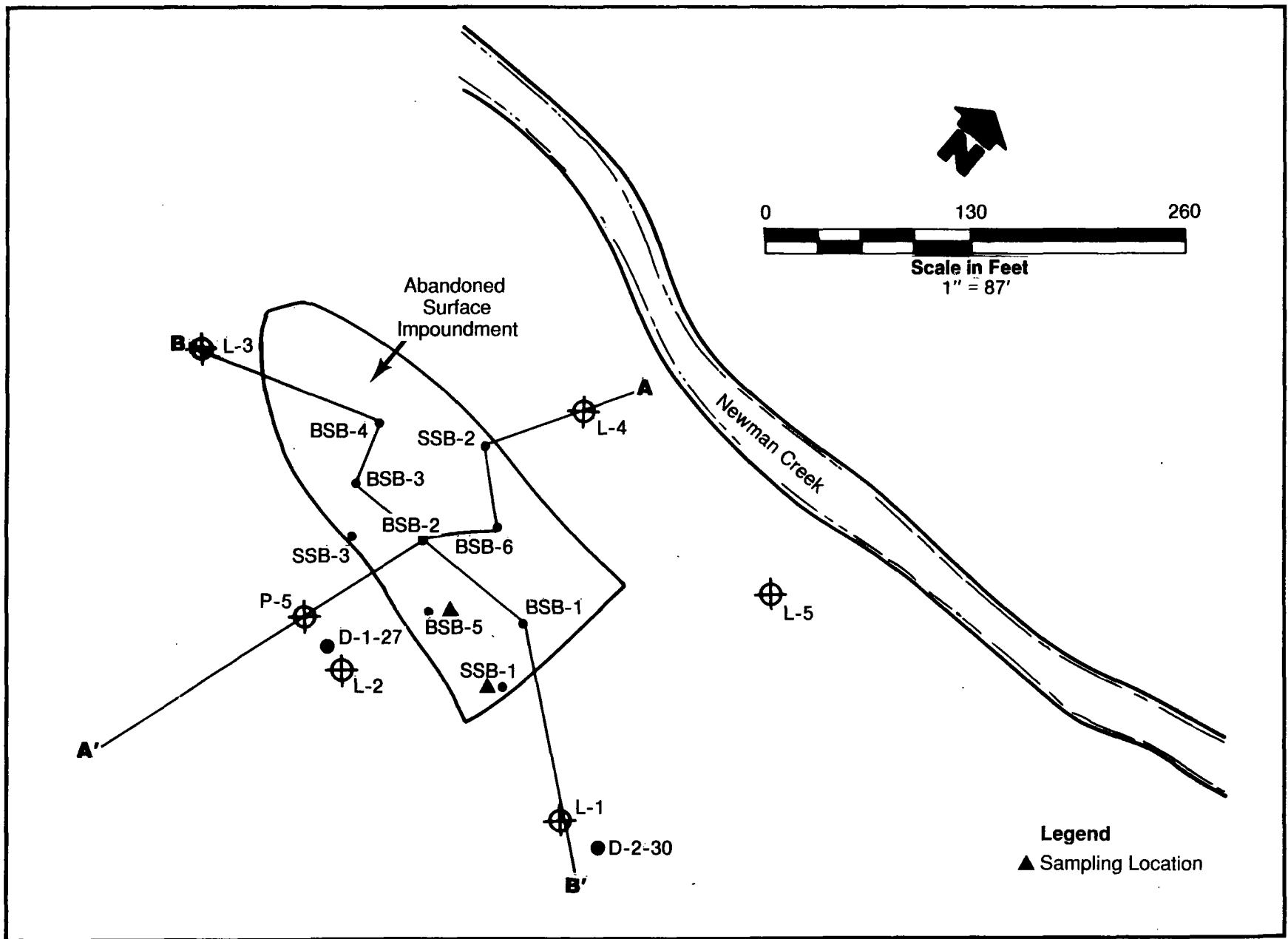


FIGURE 2-1 TREATABILITY STUDY SAMPLING LOCATIONS

Approximately 24 gallons of sludges and soils were collected. This allowed for a sufficient amount of material to determine the characteristics of the untreated material in the lagoon and to send to each vendor and WESTON approximately 6 gallons of sludges and soils for treatability tests.

The sludges and soils were mixed onsite in large stainless steel carboys and sealed in 3-gallon plastic containers. After homogenization, three samples were collected from the untreated material to assess the uniformity and initial metals and VOC concentrations as detailed in Subsection 2.4.1.

Samples were shipped to vendors in sealed 3-gallon containers under chain-of-custody procedures. The samples were shipped as environmental samples in accordance with U.S. DOT regulations.

2.3 TREATABILITY TESTING

Treatability tests were conducted by each of the three vendors. Vendors were asked to develop an admixture(s) that could meet or exceed the following performance standards:

- Triaxial permeability less than 10^{-7} cm/sec.
- Unconfined compressive strength greater than 50 psi after a 28-day cure.
- TCLP leachate meeting F006 BDAT requirements.
- Low cost.

The vendors conducted their treatability tests to determine their final design base formulation(s). Vendors performed limited physical testing (e.g., unconfined compressive strength, bulk density, etc.) in their own or in subcontractor's laboratories to develop their final design formulation.

In addition, WESTON evaluated several different formulations using cement kiln dust as a stabilizer. This involved an initial screening process to optimize stabilizer type and concentration and a final formulation of two mix designs.

Unconfined compressive strength tests, triaxial permeability tests, and TCLP leaching tests were performed only on the final design formulations. Vendors were allowed to submit up to two different final design formulations for these tests. Vendors were asked to submit a total of 11 test cylinders of specified dimensions for each final design base mixture for independent

physical and chemical testing by WESTON as detailed in Subsection 2.4.2. Test cylinders were prepared according to ASTM Method D1632 (Annual Book of ASTM Standards, Volume 04.08).

2.4 SAMPLE ANALYSIS

2.4.1 Untreated Sludge

After homogenization, three samples of the untreated sludge were subjected to the following tests and analyses by WESTON:

- Moisture content by ASTM Method D2216-71.
- Bulk density.
- Grain size distribution by ASTM Method D422-63. The sample was prepared in accordance with ASTM Method D421-58.
- TCLP metals and VOC.

Table 2-1 summarizes the number and type of analyses that were performed on the untreated sample.

Analysis for VOCs was performed on the untreated material to assess the process performance for VOCs. It should be noted that the untreated material sample was analyzed for VOCs after homogenization and mixing of the soils. An unhomogenized sample was obtained for VOC analysis at the time of sampling to determine if the homogenization procedure would cause any volatiles present to be released from the soils. The untreated material was found to contain slightly less than 200 ug/kg of VOCs before and after homogenization. Thus, volatilization should not present a problem in the full-scale treatment operation.

2.4.2 Treated Sludge

Vendors submitted test cylinders of their final design formulation to WESTON for physical and chemical testing. Vendors were asked to determine and report the bulk density and moisture content of the admixture immediately after preparation of the test cylinders.

After 7 days of curing at the vendor's facility, vendors were asked to determine and report the bulk density and unconfined compressive strength of the sample and to ship 11 test cylinders to WESTON.

Table 2-1

Physical and Chemical Testing Methods for
Untreated Sludge

Analysis	Method or Reference	Number of Samples
Moisture Content	ASTM D2216-71	3
Bulk Density		3
Grain Size Distribution ^a	ASTM D422	3
TCLP Metals	EPA SW-846	3
TCLP VOC	EPA SW-846	3
VOC	EPA SW-846	3

^aSample prepared per ASTM D421-58.

Each vendor shipped their test cylinders in sealed containers to minimize moisture loss. Upon arrival to WESTON, test cylinders were placed in a temperature and humidity control chamber at 78°F and 100 percent relative humidity for the remainder of the 28-day curing period.

After 28 days of curing, WESTON performed the following tests:

- Bulk density as calculated from the weight and dimensions of the test cylinder.
- Unconfined compression test using ASTM Method D1633-84.
- Triaxial permeability using U.S. EPA Method 9100.
- Moisture content using ASTM Method D2216-80.
- TCLP metals and VOCs.

Table 2-2 summarizes the analyses performed per each vendor formulation and Table 2-3 summarizes the total number of analyses performed during the treatability study.

Table 2-2

Physical and Chemical Testing for Each Formulation
of Treated Sludge

Material/Analysis	Analyzed by WESTON per Formulation	Analyzed by Vendor per Formulation	Total per Formulation
Treated Sludge			
Moisture Content as Received	0	1	1
Moisture Content of Final Admixture ^a	0	1	1
Bulk Density of Final Admixture ^a	0	1	1
7-Day UCS	0	3	3
28-Day UCS	3	0	3
Triaxial Permeability ^b	1	0	1
Moisture Content ^b	1	0	1
Bulk Density ^b	1	0	1
TCLP Metals ^b	1	0	1
TCLP VOC ^b	1	0	1

^aMeasured immediately after mixing.

^bAfter 28-day cure.

Table 2-3

Summary of Treatability Study Analyses

Analysis ^a	Number of Samples	
	Each Formulation	Total
Untreated Material		
Moisture Content	NA	3
Bulk Density	NA	3
Grain Size Distribution	NA	3
TCLP Metals	NA	3
TCLP VOC	NA	3
VOC	NA	3
Treated Material		
Moisture Content as Received ^b	1	e 6
Moisture Content of Final Mixture ^{b,c}	1	e 6
Bulk Density of Final Mixture ^{b,c}	1	e 6
7-Day UCS ^b	3	e 18
28-Day UCS	3	e 18
Triaxial Permeability ^d	1	e 6
Moisture Content	1	e 6
Bulk Density	1	e 6
TCLP Metals	1	e 6
TCLP VOC	1	e 6

^aAnalysis by WESTON unless otherwise noted.

^bAnalysis by vendor.

^cMeasured immediately after mixing.

^dAfter 28-day cure.

^eSix formulations submitted (2 Enreco, 1 Harmon, 1 STC, 2 WESTON).

UCS = Unconfined Compressive Strength.

NA = Not applicable since untreated material samples were obtained prior to formulation design.

SECTION 3**TREATABILITY STUDY TEST RESULTS****3.1 OVERVIEW**

The following subsections summarize the results of the physical and chemical tests performed on the untreated and treated waste material, including the initial formulation and 7-day test data provided by each vendor. Detailed test data and results are presented in Appendices A through G and include the bench-scale treatability study reports submitted by each vendor, as well as by WESTON.

3.2 UNTREATED SOIL TEST RESULTS

The following subsections present the results of the geotechnical and chemical tests performed on triplicate soil samples collected from the original bulk composite sample that was partitioned and distributed to the three vendors and WESTON. A statistical analysis was performed to determine the degree of homogeneity of the original bulk composite as measured by the percent deviation in test results between the triplicate samples. The percent deviation is defined as the standard deviation divided by the average results for the triplicate tests as a percentage. A significant deviation would be defined as 10 percent or more.

3.2.1 Geotechnical Test Results

A summary of the untreated soil geotechnical testing results is presented in Table 3-1 and includes a statistical analysis of the triplicate samples. A graphic illustration of the grain size distribution for the triplicate samples is presented in Figure 3-1.

Geotechnical test results indicate that the bulk composite sample was a homogenous soil of brown, poorly graded sand with 10 percent gravel and 28 percent low-plasticity silt. Blue-green crystals and a red-brown powdery material were observed distributed throughout the soil (approximately 1 to 3 percent by weight).

EKCO HOUSEWARES, INC
TREATABILITY STUDY

SUMMARY AND STATISTICAL ANALYSIS OF UNTREATED SOIL GEOTECHNICAL TEST RESULTS

TABLE 3-1

Project Sample Number		EKLAG-C1	EKLAG-C2	EKLAG-C3	Average	% Deviation
Soil Description		brown poorly graded sand with 10% gravel and 26% low plasticity silt, blue green crystals and red brown slag-like material present	brown poorly graded sand with 7% gravel and 30% low plasticity silt, blue green crystals and red brown slag-like material present	brown poorly graded sand with 12% gravel and 27% low plasticity silt, blue green crystals and red brown slag-like material present	brown poorly graded sand with 10% gravel and 28% low plasticity silt, blue green crystals and red brown slag-like material present	slight
USCS Soil Classification		SP/SM	SP/SM	SP/SM	SP/SM	none
Grain Size Diameter, % Finer	Sieve Size					
	mm					
	3/4"	19	100	100.0	100.0	0.0
	3/8"	9.500	99.2	97.7	97.0	1.1
	#4	4.750	89.9	93.1	88.1	2.8
	#10	2.000	77.0	80.6	76.3	2.9
	#20	0.850	61.5	65.5	63.0	3.2
	#50	0.300	42.3	46.8	44.4	5.1
	#100	0.150	31.8	36.6	33.6	7.2
	#200	0.075	25.6	30.1	26.7	8.6
Hydrometer	0.031	25.3	23.5	22.5	23.8	6.1
	0.022	22.0	21.1	20.1	21.1	4.3
	0.016	19.7	17.5	16.7	17.9	8.7
	0.012	16.3	15.0	14.4	15.2	6.5
	0.009	14.0	13.8	12.0	13.3	8.2
	0.006	10.6	9.0	8.6	9.4	11.7
	0.004	7.2	7.8	7.4	7.5	3.5
	0.003	6.1	5.3	5.1	5.5	9.6
	0.002	6.1	4.1	3.9	4.7	25.5
	0.0013	5.0	4.1	3.9	4.3	12.8
	0.0009	2.7	2.9	2.8	2.8	3.5
Moisture Content, % dry basis		54.8	56.8	55.3	55.6	1.8
Specific Gravity, dimensionless		2.74	2.75	2.74	2.7	0.3

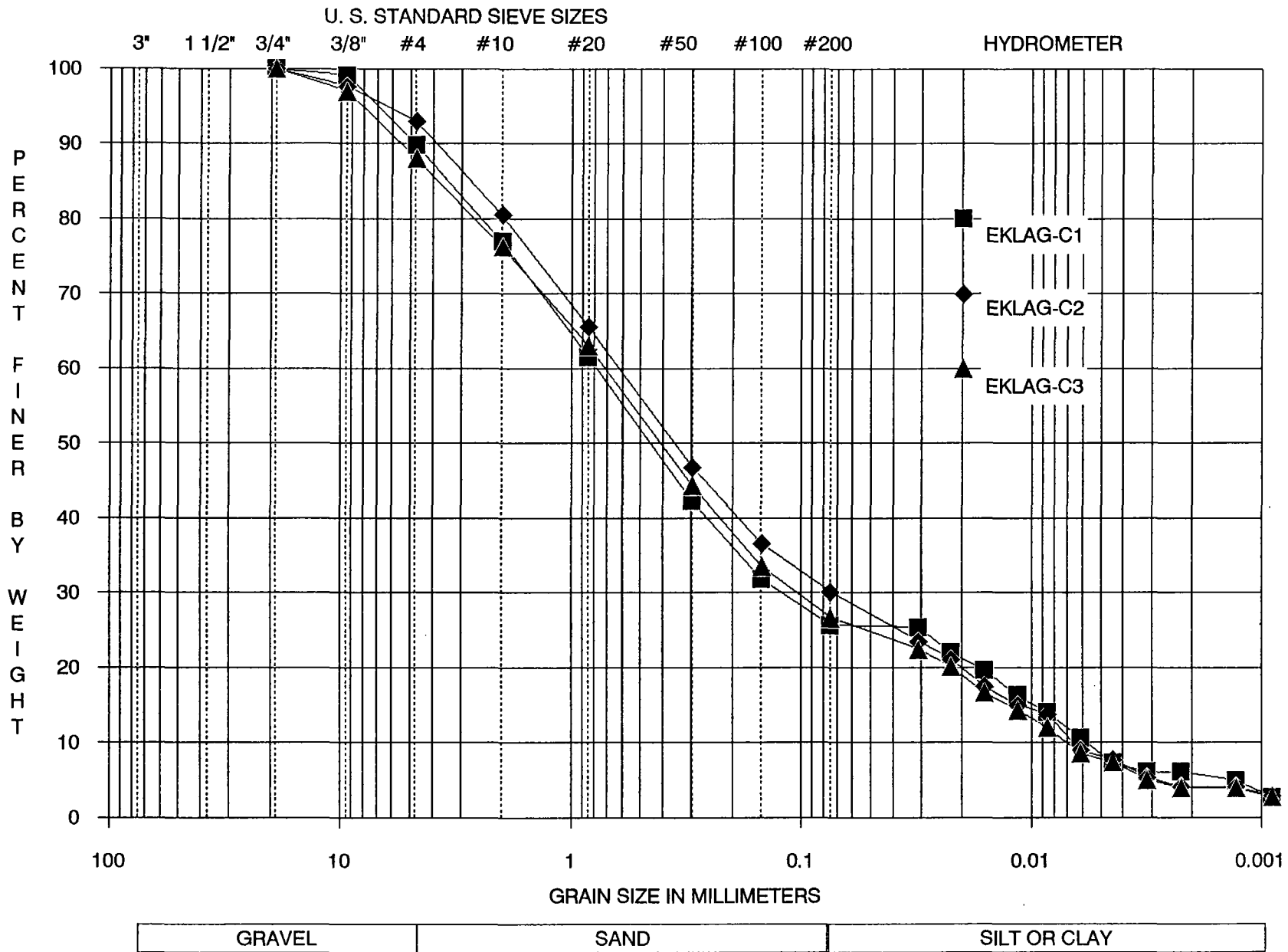


Figure 3-1 : Grain Size Distribution Curves for EKCO Housewares Untreated Soils

The soil is classified according to the Unified Soil Classification System (USCS) as SP/SM. The average percent solids content was 63.9 percent. The average specific gravity of the discrete particles was 2.74 and the average uncompacted bulk density of the soil was estimated at 100 pounds per cubic feet (pcf). The average percentage of clay is estimated at less than 5 percent based on the average percentage of particles smaller than 0.002 mm in diameter.

The geotechnical test results indicate no significant deviation in the physical properties of the triplicate soil samples except for the percentage of soil particles smaller than 0.006 mm in diameter. A percent deviation of 11.7, 25.5, and 12.8 was measured for the percentage of particles smaller than 0.006, 0.002, and 0.0013 mm in diameter. However, this magnitude of deviation can be expected for the measurement of particle sizes close to the method detection limit (0.001 mm).

3.2.2 Untreated Soil TCLP Test Results

A summary of the untreated soil TCLP metals and VOC test results is presented in Tables 3-2 and 3-3, respectively.

Results of TCLP metals analysis (Table 3-2) show that barium, cadmium, and selenium were the only metals detected in the TCLP extract of all three untreated soil samples. The average concentration of barium, cadmium, and selenium was 0.77, 4.9, and 0.039 milligrams per liter, respectively. The percent deviation in the TCLP metals test results did not exceed 6 percent for all parameters, indicating that the metals distribution was uniform in the original bulk composite sample. This included less than a 2 percent deviation for the contaminant of major concern, cadmium.

All metals in the untreated soil except cadmium were less than the EP Toxicity Maximum Contaminant Level (MCL). A comparison of the untreated soil average TCLP metals results with the treated soil TCLP metals results is presented in Subsection 3.3.

Results of the TCLP VOC analysis (Table 3-3) show that methylene chloride, acetone, 4-methyl-2-pentanone, and 1,1,1-trichloroethane were the only TLCP VOCs detected in the extract of the triplicate untreated soil samples. However, all of these compounds were also detected in the laboratory TCLP blank extract, indicating probable laboratory contamination.

EKCO HOUSEWARES, INC
TREATABILITY STUDY

SUMMARY AND STATISTICAL ANALYSIS OF UNTREATED SOIL
TCLP METALS ANALYTICAL RESULTS (1)

TABLE 3-2

Parameter	Total Metals Concentration in TCLP Extract, milligrams per liter (2)				Percent Deviation	Maximum Allowable(3)
	EKLAG-C1	EKLAG-C2	EKLAG-C3	Average		
Silver	0.030 U	0.030 U	0.030 U	0.030 U	0.0	5.0
Arsenic	0.016 U	0.016 U	0.016 U	0.016 U	0.0	5.0
Barium	0.79	0.77	0.76	0.77	2.0	100
Cadmium	4.9	5.0	4.8	4.9	2.0	1.0
Chromium	0.020 U	0.020 U	0.020 U	0.020 U	0.0	5.0
Mercury	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0	0.2
Lead	0.050 U	0.050 U	0.050 U	0.050 U	0.0	5.0
Selenium	0.038	0.038	0.042	0.039	5.9	1.0

Notes

(1) triplicate soil samples collected from a mixed composite sample representing the site

(2) U - indicates compound was analyzed for but not detected, the value reported is the detection limit

(3) 40 CFR 261.24(b), concentrations in mg/l

EKCO HOUSEWARES, INC
TREATABILITY STUDY

SUMMARY AND STATISTICAL ANALYSIS OF UNTREATED SOIL
TCLP VOLATILE ORGANIC COMPOUND (VOC) ANALYTICAL RESULTS (1)

TABLE 3-3

Analytical Parameter	VOC Concentration in TCLP Extract, micrograms per liter (2)				Percent Deviation
	EKLAG-C1	EKLAG-C2	EKLAG-C3	Average	
Methylene Chloride	11 T	10 T	14 T	12 T	17.8
Acetone	46 T	64 T	250 T	120 T	94.1
1,1,1 Trichloroethane	23 T	25 T	32 T	23 T	33.2
4-Methyl-2-Pentanone	20 T	25 T	24 T	33 T	11.5

Notes

(1) triplicate soil samples collected from a mixed composite sample representing the site

(2) T - indicates compound was found in the TCLP extraction blank and in the sample

The average concentrations of methylene chloride, acetone, 4-methyl-2-pentanone, and 1,1,1-trichloroethane were 12, 120, 23, and 33 micrograms per liter, respectively. The percent deviation in the TCLP VOC test results exceeded 11.5 percent for all TCLP VOC parameters, with the greatest deviation for acetone, at 94 percent, indicating that either the distribution of TCLP VOCs was not uniform throughout the original bulk composite sample or that the magnitude of laboratory contamination was not consistent for each sample.

A comparison of the untreated soil average TCLP VOC results with the treated soil TCLP VOC results is presented in Subsection 3.3.

3.2.3 VOC Test Results

A summary of the untreated soil VOC test results is presented in Table 3-4. Results show that seven VOC compounds were detected in the untreated soil, with an average total VOC concentration of 122 micrograms per kilogram. These compounds included methylene chloride, acetone, 1,2-dichloroethene (total), 1,1,1-trichloroethane, trichloroethene, tetrachloroethene, and toluene. The percent deviation in VOC test results exceeded 10 percent for all parameters, indicating that the distribution of VOCs was not uniform throughout the original bulk composite sample. However, the average total VOC concentration does confirm the results of previous investigations, which indicated that the total VOCs are less than 300 ug/kg and would not affect the stabilization process, and that the resulting fugitive VOC emissions created during mixing operations would be minimal.

3.3 TREATED SOIL TEST RESULTS

The following subsections present the results of the physical and chemical tests performed on the vendors' treated soil samples. Physical test data and results are presented in Subsection 3.3.1 and include data provided by each vendor for the formulation and 7-day testing, and also includes the 28-day data and results for tests performed by WESTON. The TCLP metals and VOC test results for the treated soil samples are presented in Subsection 3.3.2, and includes a comparison of the untreated soil TCLP metals and VOC test results with the maximum contaminant level.

EKCO HOUSEWARES, INC
TREATABILITY STUDY

SUMMARY AND STATISTICAL ANALYSIS OF UNTREATED SOIL
VOLATILE ORGANIC COMPOUND (VOC) ANALYTICAL RESULTS (1)

TABLE 3-4

Analytical Parameter	VOC Concentration in Soil, milligrams per kilogram (2)				Percent Deviation
	EKLAG-C1	EKLAG-C2	EKLAG-C3	Average	
Methylene Chloride	320	170	42	177	78.5
Acetone	23	25	21	23	8.7
1,2 Dichloroethene(Total)	3 J	8 U	8 U	1 J	173.2
1,1,1 Trichloroethane	16	5 J	12	11	50.6
Trichloroethene	7 J	8 U	8 U	2 J	173.2
Tetrachloroethene	170	140	44	118	55.8
Toluene	2 J	8 U	8 U	1 J	173.2

Notes

- (1) triplicate soil samples collected from a mixed composite sample representing the site
 (2) U - indicates compound was analyzed for but not detected, the value reported is the detection limit
 J - indicates an estimated value for an identified compound but the result is less than the specified detection limit

3.3.1 Physical Test Results

A summary of each vendor's treated soil physical test data and results is presented in Table 3-5. Data are grouped into categories that proceed from top to bottom in chronological order with respect to the formulation, creation, and curing of the sample.

The mix design category shows the percentages of sludge and soil material and stabilizer used in each vendor formulation on a percent by weight wet basis. Note that Enreco and Harmon did not provide formulation data because their stabilizers are proprietary additives. However, Enreco and Harmon will provide more information on their formulation if they are awarded the stabilization contract. Enreco did not report details of their stabilizer or the chemistry involved. Harmon reported that their stabilizer was a cementitious binder with a well-known chemistry of reaction.

STC reported using 12 percent stabilizer, which consisted of two reagents, 11 percent liquid activator, and 11 percent Soilsorb HM reagent. These are proprietary additives. STC reported a two-phase reaction process. For Phase I, a liquid activator is added and mixed with the waste to form highly insoluble heavy metal compounds. This reaction prevents the heavy metals from interfering with the hydration process that occurs in the second phase. Phase II involves the addition of the Soilsorb HM reagent and subsequent hydration and solidification of the soil/stabilizer mix. The chemistry of Phase II was reported to be analogous to the hydration of Portland cement.

As a baseline treatment formulation, WESTON used cement kiln dust (CKD) at two concentrations, 13.8 and 21.5 percent by weight wet basis. The chemistry of stabilization using CKD is similar to Portland cement, except that the reaction process is typically slower and requires higher concentrations of CKD than Portland cement to produce an equivalent degree of stabilization.

EKCO HOUSEWARES, INC
TREATABILITY STUDY

SUMMARY OF VENDOR MIX DESIGN PHYSICAL DATA AND TESTING RESULTS

TABLE 3-5

Vendor Mix Design Code	ENRECO A	ENRECO B	HARMON AHG	STC 1327	WESTON 1	WESTON 2
Mix Design, % by Wt. Wet Basis						
Untreated Material	NP	NP	NP	88.0	86.2	78.5
Total Stabilizers	NP	NP	NP	12.0	13.8	21.5
Untreated Material Data						
Moisture Content, % Wet Basis	35.2	34.2	37.0	30.2	36.1	36.1
Total Solids, %	64.8	65.8	63.0	69.8	63.9	63.9
Wet Unit Weight, lb/ cu ft	107.7	107.7	100.0	82.7	100.0	100.0
Initial Mix Data						
Moisture Content, % Wet Basis	32.4	28.5	NP	47.8	29.4	27.3
Total Solids, %	67.6	71.5	NP	52.2	70.6	72.7
Wet Unit Weight, lb/ cu ft	111.2	109.2	NP	NP	59.3	59.6
Net Volume Increase, %	NP	NP	NP	NP	95.7	113.8
7 Day Test Results						
Wet Unit Weight, lb/ cu ft	105.1	105.3	117.0	99.3	108.6	107.3
Net Volume Increase, %	NP	NP	<10	8.3	6.8	18.8
Ultimate Stress, psi	>53.4	36.4	490.0	>50	60.4	127.0
28 Day Test Results						
Moisture Content, % Wet Basis	28.5	30.5	25.7	30.8	24.3	23.3
Total Solids, %	71.5	69.5	74.3	69.2	75.7	76.7
Wet Unit Weight, lb/ cu ft	109.6	107.6	115.3	89.7	107.8	105.8
Ultimate Stress, psi	>129.7	88.1	>179.1	78.8	67.5	129.1
Permeability, cm/sec	4.49E-06	5.73E-06	7.07E-07	1.03E-05	4.51E-05	1.32E-05

Notes

NP = data not provided by vendor

The untreated material data category presents the untreated soil moisture content and wet unit weight results provided by each vendor. Moisture contents ranged from 30.2 to 37.0 percent by weight wet basis. The deviations in results indicate possible moisture losses during shipping and handling. The wet unit weights ranged from 82.7 to 108 pounds per cubic foot (pcf) and were dependent on the test method used by each vendor. Enreco compacted the "as received" soil into cube molds of known volume using a tamping rod and measured soil weight in the mold. The compactive effort was equivalent to a standard proctor compactive effort (ASTM D697). Harmon assumed an in situ wet unit weight of 100 pcf. STC placed the untreated soil into a mold of known volume using a minimal compactive effort and measured the weight of soil in the mold. WESTON assumed an in situ unit weight of 100 pcf based on data from previous investigations that reported a range of wet unit weights from 80 to 120 pcf.

The moisture content and in situ wet unit weight of the untreated soil are important parameters for the formulation of mix designs and for estimating the cost of stabilization. The most conservative approach is to use the maximum moisture content and wet unit weight to formulate the mix design and to estimate the total weight of soil material that is present in a given volume, since reagent costs are usually based on percent by weight.

The initial mix data category presents the moisture content, wet unit weight, and volume increase results for each formulation immediately after mixing. The moisture contents ranged from 27.3 to 47.8 depending on the concentration and moisture content of the stabilizer used. All moistures reportedly decreased except for STC's mix design, which increased in moisture due to the use of a liquid stabilizer and the addition of water to form a concrete-like slurry. Harmon did not report the moisture content of its initial mix.

The wet unit weights of the initial mix designs for each vendor ranged from 59.3 to 111.2 pcf. The variability was due to the use of different test methods by each vendor. Enreco compacted their initial mix before determining unit weight according to the same method used for the untreated soil. Harmon and STC did not report wet unit weights, and WESTON measured the loose unit weight of the fresh mix with minimum compaction.

WESTON reported a net volume increase from the original soil volume for the fresh mix of 96 and 114 percent for formulations WESTON 1 and WESTON 2, respectively. The other vendors did not report the wet volume increase for initial mix designs.

The initial wet unit weight (and therefore the initial net volume increase) was determined to estimate the volume of uncompacted fresh mix that would be handled (staging, conveying, etc.) during certain non-in situ stabilization operations, and an estimate was performed of the net volume increase due to bulking that will occur during in situ stabilization operations. The net volume increase of the initial mixes was calculated for each vendor's formulation if the percentage of stabilizer and initial uncompacted wet unit weight was provided.

The 7-day test data category presents the wet unit weight, net volume increase, and compressive strength of each vendor's formulation after compaction into test molds and curing for 7 days. These data were provided by each vendor. The wet unit weights ranged from 99 pcf to 117 pcf depending on the compactive effort and type and quantity of stabilizer used by each vendor. Harmon reported the highest unit weight of 117 pcf, and STC reported the lowest unit weight of 99 pcf.

The net volume increase over the original waste volume for the compacted mixes after 7 days of curing ranged from 7 to 19 percent depending on which method each vendor used for the untreated soil unit weight determination. If the vendor measured or estimated a low unit weight, the net increase in volume would be low or possibly negative. If the vendor measured or estimated a higher unit weight, the net increase in volume would be higher.

The 7-day unconfined compressive strengths (UCS) ranged from 36 to 490 pounds per square inch (psi). Enreco's B formulation was the only mix design that did not reach 50 psi within 7 days.

The 28-day test data category presents the moisture content, wet unit weight, compressive strength, and permeability of each vendor's formulation after 28 days of curing. Testing for these parameters was performed by WESTON. The moisture contents ranged from 23 to 31 percent, and in general represent a slight decrease in unbound moisture due to the curing process. This loss of unbound moisture also caused a slight decrease in the wet unit weight, which ranged from 90 to 115 pcf.

The unconfined compressive strengths ranged from 68 to greater than 179 psi. All mix designs exceeded the 50 psi compressive strength criteria.

Permeabilities ranged from 4.51×10^{-5} centimeters per second (cm/sec) to 7.07×10^{-7} cm/sec. Harmon's mix design had the lowest permeability and was the only formulation meeting the 10^{-7} cm/sec permeability criteria. Enreco's mix A and B were a magnitude lower, at 4.49×10^{-6} and 5.73×10^{-6} cm/sec, respectively. STC's formulation resulted in a permeability two magnitudes lower, at 1.03×10^{-5} cm/sec. WESTON's Formulations 1 and 2 resulted in permeabilities similar to STC's, at 4.51×10^{-5} and 1.32×10^{-5} cm/sec, respectively.

3.3.2 TCLP Test Results

A summary of each vendor's treated soil TCLP metals and VOC test results is presented in Tables 3-6 and 3-7, respectively.

Results of the TCLP metals analysis indicate that the treated soil samples submitted by Enreco, Harmon, and STC produced extracts with concentrations less than the EP Toxicity and F006 maximum allowable levels for each metal. WESTON's treated soil samples produced extracts with concentrations less than the allowable for each metal, except cadmium.

Silver, arsenic, mercury, and lead were not detected in the extracts produced by any of the vendor's treated soil samples. Cadmium was also not detected in Enreco's or Harmon's treated soil TCLP extract.

Although chromium was not detected in the untreated soil extract, chromium was detected in each vendor's treated soil extracts, except for WESTON's Formulation.

Results of the TCLP VOC results show that a total of nine VOCs were detected among all of the treated soil extracts, and all but two were also detected in the TCLP blank extract. These were 2-butanone and 4-methyl-2-pentanone. The total VOC concentration in the extract for any of the vendor's treated soil did not exceed 200 micrograms per liter.

EKCO HOUSEWARES, INC
TREATABILITY STUDY

COMPARISON OF UNTREATED AND TREATED SOIL TCLP METALS
CONCENTRATIONS WITH THE MAXIMUM ALLOWABLE CONCENTRATIONS

TABLE 3-6

Parameter	Total Metals Concentration in TCLP Extract, milligrams per liter (1)								
	Untreated Soil (2)	ENRECO		HARMON AHG	STC 1327	WESTON		Maximum Allowable (3)	Treatment Standard(4)
		A	B			1	2		
Silver	0.030 U	0.030 U	0.030 U	0.030 U	0.030 U	0.030 U	0.030 U	5.0	0.072
Arsenic	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U	5.0	NA
Barium	0.77	0.43	0.78	0.47	0.44	0.43	0.68	100	NA
Cadmium	4.9	0.0040 U	0.0040 U	0.0040 U	0.0052	6.6	1.7	1.0	0.066
Chromium	0.020 U	0.060	0.079	0.140	0.098	0.020 U	0.140	5.0	5.2
Mercury	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.2	NA
Lead	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	5.0	0.51
Selenium	0.039	0.050	0.051	0.041	0.029	0.039	0.062	1.0	NA

Notes

- (1) U - indicates compound was analyzed for but not detected, the value reported is the detection limit
 (2) average results of triplicate soil samples collected from a mixed composite sample representing the site
 (3) 40 CFR 261.24(b)
 (4) 40 CFR 268.41 Land Disposal Restrictions for F006 wastes
 (5) NA = not applicable

EKCO HOUSEWARES, INC
TREATABILITY STUDY

COMPARISON OF UNTREATED AND TREATED SOIL TCLP VOLATILE ORGANIC COMPOUND (VOC)
CONCENTRATIONS WITH THE MAXIMUM ALLOWABLE CONCENTRATIONS

TABLE 3-7

Parameter	VOC Concentration in TCLP Extract, micrograms per liter (1)						
	Untreated Soil (2)	ENRECO		HARMON	STC	WESTON	
		A	B	AHG	1327	1	2
Methylene Chloride	12 T	5 T	5 T	35 T	7 T	10 T	14 T
Acetone	120 T	150 T	120 T	92 T	E T	63 T	110 T
Carbon Disulfide	5 U	5 U	5 U	5 U	5 U	7	5 U
Chloroform	5 U	5 U	5 U	5 U	5 U	1 JT	1 JT
2-Butanone	10 U	19	10 U	10 U	10 U	10 U	10 U
1,1,1 Trichloroethane	33 T	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentane	23 T	28 T	25 T	10 U	28 T	15	16
Tetrachloroethene	5 U	5 U	5 U	5 U	5 U	5 U	1 J
Chlorobenzene	5 U	3 JT	5 U	5 U	5 U	3 JT	3 JT

Notes

(1) U - indicates compound was analyzed for but not detected, the value reported is the detection limit

T - indicates compound was found in the TCLP extraction blank and in the sample

J - indicates an estimated value for an identified compound but the result is less than the specified detection limit

E - indicates concentration exceeded calibration range of instrument

(2) average results of triplicate soil samples collected from a mixed composite sample representing the site

SECTION 4

CONCLUSIONS

Based on test results of untreated waste material, the following conclusions can be made:

- The original bulk composite sample, partitioned and distributed to each vendor, was homogeneous with respect to the uniformity of its physical properties and concentration of metals.
- The waste material evaluated was a brown, poorly graded sand with 10 percent gravel and 28 percent low-plasticity silt, with a USCS classification of SP/SM, a moisture content of 36.1 percent wet basis, a specific gravity of 2.74, and an estimated in situ unit weight of 100 pcf.
- Cadmium was the only TCLP metal in the untreated soil that exceeded the EP Toxicity maximum allowable concentrations.
- The VOC and TCLP VOC concentrations measured in the untreated soil were insignificant and are not expected to affect the full-scale stabilization process.

Based on the results of the bench-scale treatability study, the following conclusions can be made:

- The net volume increase of each formulation submitted is less than 19 percent of the original waste volume.
- All vendor and WESTON mixtures were greater than 50 psi after a 28-day cure.
- All vendor and WESTON mixtures had reasonably low permabilities of less than 10^{-5} cm/s.
- The TCLP metals concentrations for the vendor formulations submitted were all less than the MCL (Maximum Contaminant Level.) WESTON mixtures did not meet the MCL for cadmium.

- The TCLP total VOC concentrations for each formulation submitted was less than 200 ug/L.
- All vendor mixtures met the treatment standards for F006 as specified in 40 CFR Part 268. WESTON mixtures did not meet the treatment standards for cadmium.
- All vendor mixtures generally meet the treatment objectives of this study.

APPENDIX A

UNTREATED SOIL GEOTECHNICAL TEST REPORT

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

SOIL CHARACTERIZATION TEST RESULTS			
PROJECT	ECKO HOUSEWARES	PROJECT SAMPLE I.D.	EKLAG-C1
JOB NUMBER	900201	ETL SAMPLE NUMBER	001
W. O. NUMBER	2994-02-03-0019	TEST DATE	4/5/90

DRY SOIL DESCRIPTION	USCS SOIL CLASS
brown poorly graded sand with 10% gravel and 26% silt and clay blue green crystals and red brown slag-like material present	SP/(SM&SC)

GRAIN SIZE RESULTS		
U. S. Standard Sieve Size	Diameter mm	% Finer
3"	75.000	100.0
1 1/2"	37.500	100.0
3/4"	19.000	100.0
3/8"	9.500	99.2
#4	4.750	89.9
#10	2.000	77.0
#20	0.850	61.5
#50	0.300	42.3
#100	0.150	31.8
#200	0.075	25.6
HYDROMETER	0.0310	25.3
	0.0224	22.0
	0.0160	19.7
	0.0116	16.3
	0.0086	14.0
	0.0062	10.6
	0.0044	7.2
	0.0032	6.1
	0.0022	6.1
	0.0013	5.0
	0.0009	2.7

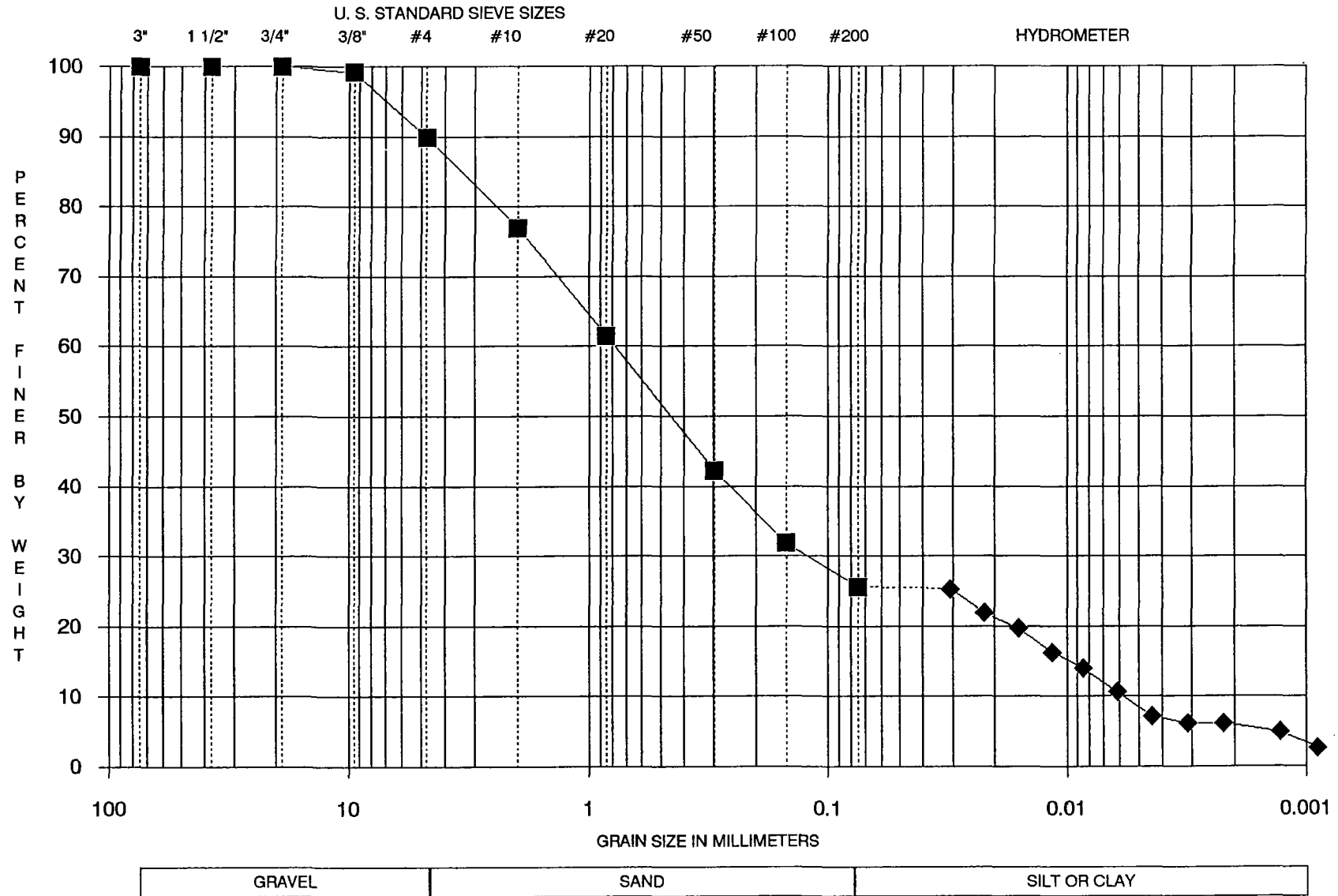
EFFECTIVE SIZES	
% Finer	Diameter mm
60	0.806
30	0.128
10	0.006
Uniformity Coefficient	Gradation Coefficient
NA	NA

NATURAL MOISTURE CONTENT, % dry basis
54.8

SPECIFIC GRAVITY
2.74

NOTES
NA=NOT APPLICABLE

GRAIN SIZE DISTRIBUTION CURVE FOR
ECKO HOUSEWARES PROJECT SAMPLE EKLAGE-C1, ETL SAMPLE # 900201-001



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

SOIL CHARACTERIZATION TEST RESULTS			
PROJECT	ECKO HOUSEWARES	PROJECT SAMPLE I.D.	EKLAG-C2
JOB NUMBER	900201	ETL SAMPLE NUMBER	002
W. O. NUMBER	2994-02-03-0019	TEST DATE	4/5/90

DRY SOIL DESCRIPTION	USCS SOIL CLASS
brown poorly graded sand with 7% gravel and 30% silt and clay blue green crystals and red brown slag-like material present	SP/(SM&SC)

GRAIN SIZE RESULTS		
U. S. Standard Sieve Size	Diameter mm	% Finer
3"	75.000	100.0
1 1/2"	37.500	100.0
3/4"	19.000	100.0
3/8"	9.500	97.7
#4	4.750	93.1
#10	2.000	80.6
#20	0.850	65.5
#50	0.300	46.8
#100	0.150	36.6
#200	0.075	30.1
HYDROMETER	0.0315	23.5
	0.0226	21.1
	0.0163	17.5
	0.0117	15.0
	0.0086	13.8
	0.0062	9.0
	0.0044	7.8
	0.0032	5.3
	0.0022	4.1
	0.0013	4.1
	0.0009	2.9

EFFECTIVE SIZES	
% Finer	Diameter mm
60	0.687
30	0.074
10	0.007
Uniformity Coefficient	Gradation Coefficient
NA	NA

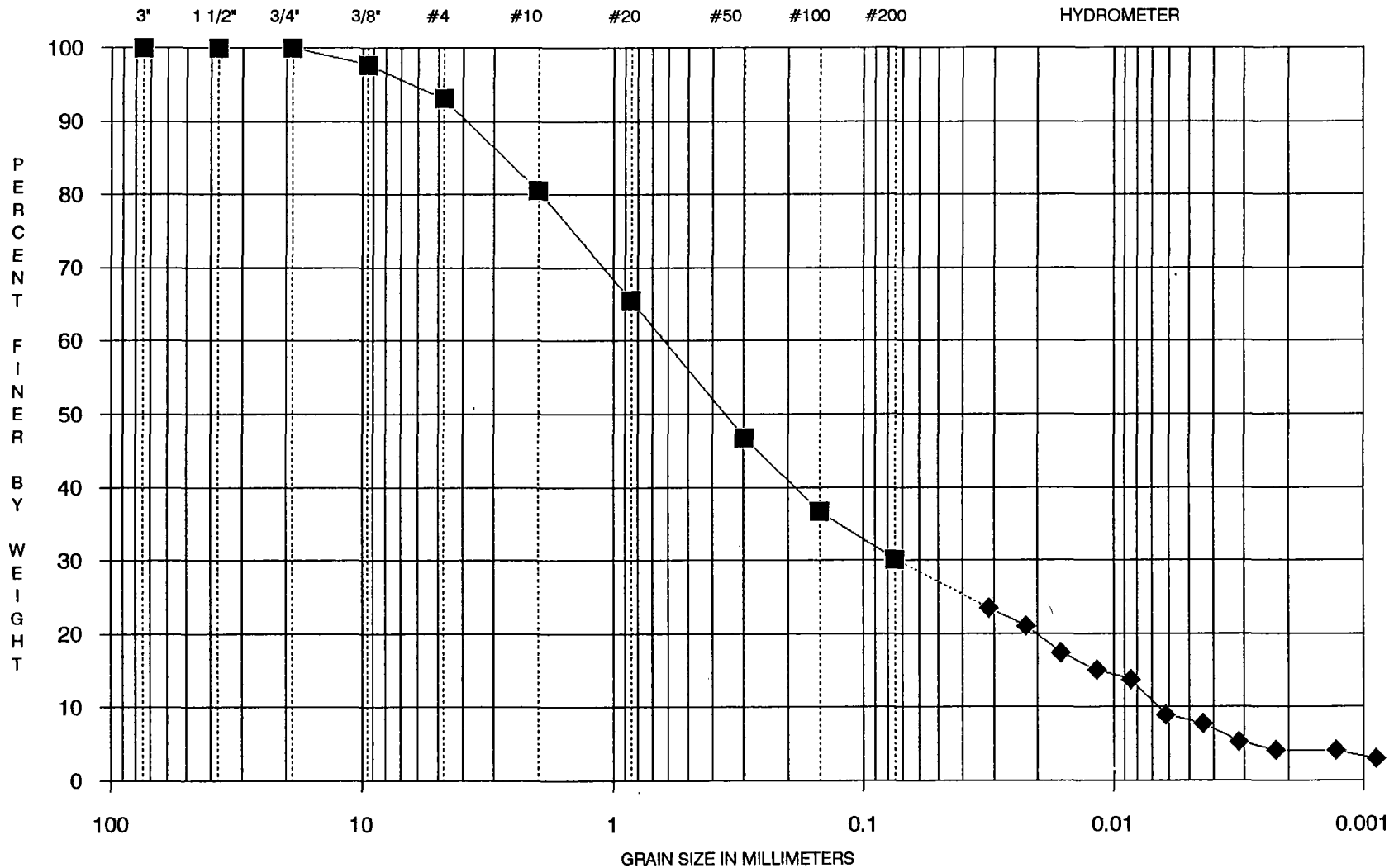
NATURAL MOISTURE CONTENT, % dry basis
56.8

SPECIFIC GRAVITY
2.75

NOTES
NA=NOT APPLICABLE

GRAIN SIZE DISTRIBUTION CURVE FOR
ECKO HOUSEWARES PROJECT SAMPLE EKLAGE-C2, ETL SAMPLE # 900201-002

U. S. STANDARD SIEVE SIZES



GRAVEL	SAND	SILT OR CLAY
--------	------	--------------

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

SOIL CHARACTERIZATION TEST RESULTS			
PROJECT	ECKO HOUSEWARES	PROJECT SAMPLE I.D.	EKLAG-C3
JOB NUMBER	900201	ETL SAMPLE NUMBER	003
W. O. NUMBER	2994-02-03-0019	TEST DATE	4/5/90

DRY SOIL DESCRIPTION	USCS SOIL CLASS
brown poorly graded sand with 12% gravel and 27% silt and clay blue green crystals and red brown slag-like material present	SP/(SM&SC)

GRAIN SIZE RESULTS		
U. S. Standard Sieve Size	Diameter mm	% Finer
3"	75.000	100.0
1 1/2"	37.500	100.0
3/4"	19.000	100.0
3/8"	9.500	97.0
#4	4.750	88.1
#10	2.000	76.3
#20	0.850	63.0
#50	0.300	44.4
#100	0.150	33.6
#200	0.075	26.7
HYDROMETER	0.0316	22.5
	0.0226	20.1
	0.0163	16.7
	0.0117	14.4
	0.0086	12.0
	0.0062	8.6
	0.0044	7.4
	0.0032	5.1
	0.0023	3.9
	0.0013	3.9
	0.0009	2.8

EFFECTIVE SIZES	
% Finer	Diameter mm
60	0.760
30	0.111
10	0.007
Uniformity Coefficient	Gradation Coefficient
NA	NA

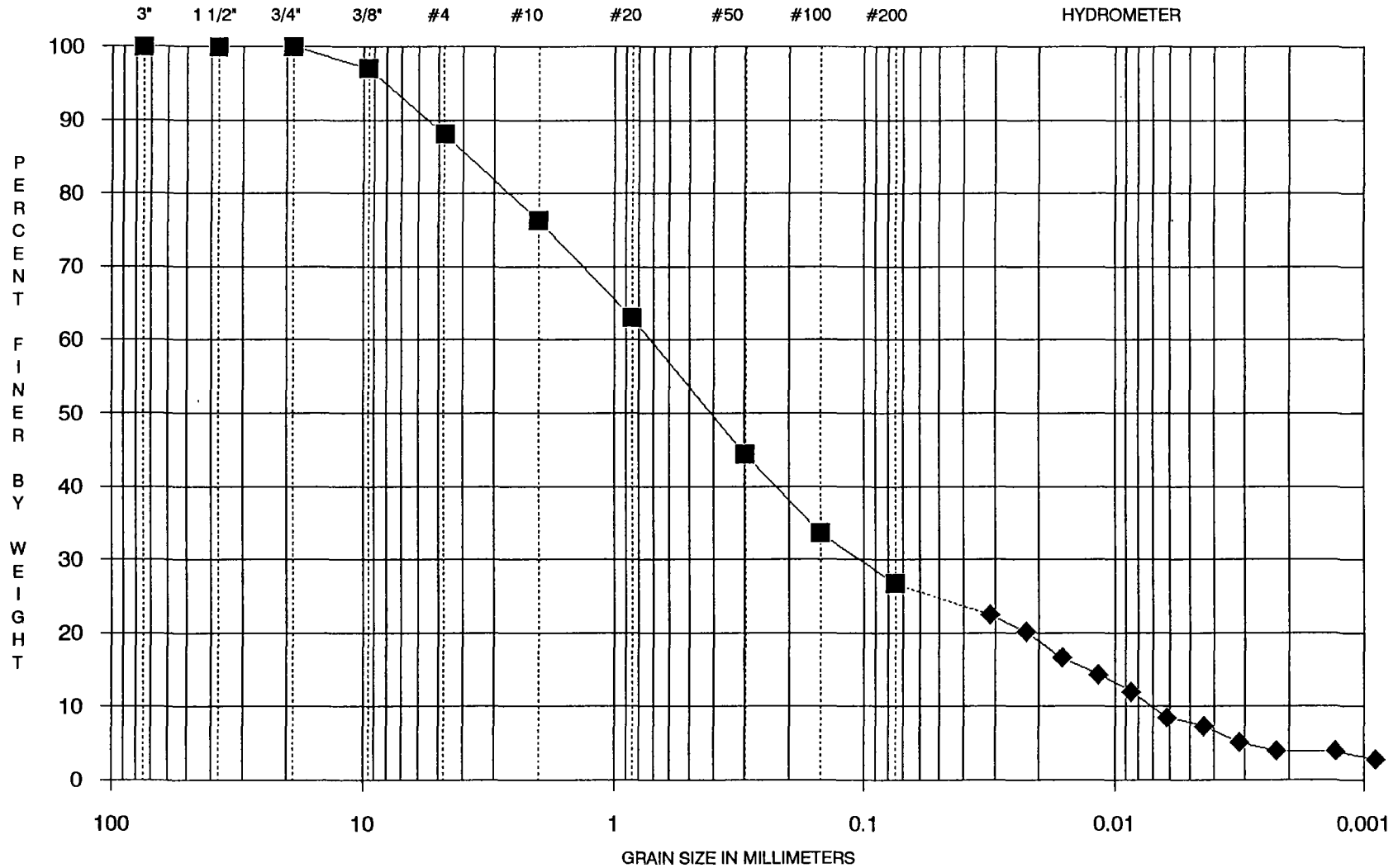
NATURAL MOISTURE CONTENT, % dry basis
55.3

SPECIFIC GRAVITY
2.74

NOTES
NA=NOT APPLICABLE

GRAIN SIZE DISTRIBUTION CURVE FOR
ECKO HOUSEWARES PROJECT SAMPLE EKLAGE-C3, ETL SAMPLE # 900201-003

U. S. STANDARD SIEVE SIZES



GRAVEL	SAND	SILT OR CLAY
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WESTON

APPENDIX B

ENRECO TREATABILITY STUDY REPORT

February 20, 1990

ROY F. WESTON, INC.
Attn: Joe Martino
ETL Lab
254 Welsh Pool Road
Lionville, PA 19353

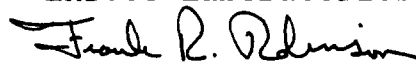
RE: Enreco Project # 90-02-014 Weston - EKCO WO# 2994-02-03
Sample # S90-2083 & S90-2084

Dear Mr. Martino:

Please find enclosed two (2) sets of nine (9) 3" X 6" cylinder molds labelled Mix A and Mix B. These cylinders contain stabilized material relating to the above project and are being sent to you as directed in the letter we received January 26, 1990. We were unable to generate eleven (11) test cylinders per mix as requested due to limited material.

Specific mix information and the requested physical parameters can be obtained from Tony Boothby, Enreco Regional Manager. Chain of custody paperwork is enclosed for your files and please let us know if you have any questions.

Sincerely,
Enreco Laboratories



Frank R. Robinson
Stabilization Manager

cc: Tony Boothby
Project File

806-379-6424

806-379-6424

ENRECO, INC.

February 19, 1990

ENRECO

Mr. Harold Byer
Weston
Weston Way
West Chester, PA 19380

RE: WO #2994-02-03

Dear Mr. Byer:

ENRECO, Inc. has successfully stabilized over 2.4 million cubic yards of waste soil and sludges at 224 different sites across the U.S.A. Our success can be attributed to the realization that each project is different. Because each site and waste stream is unique we select from our extensive stabilization reagent data base (over 50 different reagents from the U.S.) several mix designs for the treatability study. Contrary to most firms who are married to one type of process or reagent ENRECO, Inc. believes that various reagents based on proven chemistry will provide the client the most cost effective and environmentally sound closure.

Predicated on this philosophy we have submitted to you for further UCS permeability and T.C.L.P. testing two different reagent mix designs and stabilization techniques. The option A mix is based on Insitu stabilization with Hydro-Injection and Method B is based on the ENRECO Pug Mill mixing alternative. Please see enclosed descriptions for each along with the Laboratory Report for stabilization. A review of each process and estimated cost for each is listed below for your evaluation.

OPTION A - HYDRO-INJECTION

The ENRECO Hydro-Injection system stabilized waste in-situ at a maximum depth of 12 feet. The HI system moves laterally along the 10' encircling embankment and is capable of stabilizing a 25' pass (distance from beam). Upon completion of each pass the HI system operates directly on top of previously stabilized material. This process is repeated until the entire contents of the lagoon have been stabilized.

The HI system will stabilize 1,000 cys of raw sludge daily and is not affected by weather with the exception of subfreezing temperatures. Cold weather severely retards the stabilization chemistry.

The estimated cost for Option A Stabilization/Fixation at your project is \$35/cy of raw inplace sludge.

The estimated total cost is as follows:

<u>ITEM</u>	<u>UNIT COST</u>	<u>EST.QTY.</u>	<u>EST.TOTAL</u>
Mobilization	\$5,000	1	\$ 5,000
In-situ Fixation	\$35/cy	14,000 cys	\$490,000
Demobilization	\$5,000	1	\$ 5,000
Estimated Total:			\$500,000

OPTION A - ADVANTAGES

- *Dust Free.
- *Encapsulation is more efficient due to slurry form.
- *Reduces waste handling.
- *Undisturbed curing of stabilized waste.

OPTION B

The ENRECO Pug Mill System requires a working surface area of 50' X 120' for placement of the system. Additional space will also be necessary for a stabilized waste curing area. The stabilized curing area will be necessary as temporary storage until final T.C.L.P. results are confirmed to be passing. The Pug Mill will stabilize waste at the rate of 500 cys per day. Excavation and Back Filling of stabilized waste may be affected by rain or adverse weather conditions.

The estimated cost for excavation, stabilization and backfilling with Option B is \$47/cy of raw inplace sludge.

The estimated total cost is as follows:

<u>ITEM</u>	<u>UNIT COST</u>	<u>EST.QTY</u>	<u>EST.TOTAL</u>
Mobilization	\$13,500	1	\$ 13,500
Fixation	\$47/cy	14,000	\$658,000
Demobilization	\$13,500	1	\$ 13,500
Estimated Total:			\$685,000

Thank you for the opportunity to provide this information. If I can be of additional service contact me anytime at your convenience.

Sincerely,

A.R. Boothby

Anthony R. Boothby
Midwest Regional Manager

ARB/cjm

Enclosure

cc: Thomas DeGrood



ENRECO LABORATORIES STABILIZATION REPORT

CLIENT: Enreco, Inc. - Tony Boothby

PROJECT: Weston - EKCO

ADDRESS: 431 Ohio Pike #157 South
Cincinnati, OH 45255

SAMPLE INFORMATION

ENRECO PROJECT #: 90-02-014

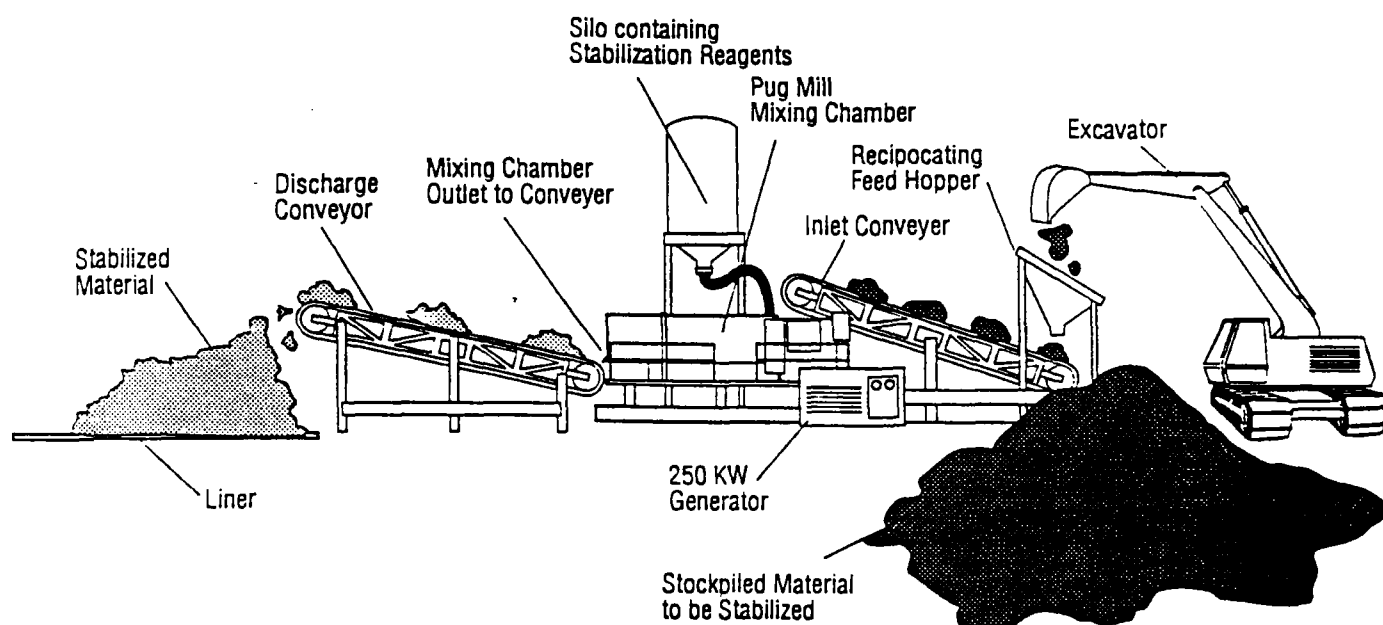
DATE RECEIVED: 02-02-90

<u>Enreco Sample #</u>	<u>Client Sample Id.</u>	<u>Formulation Id.</u>
S90-2083	EK Lag - 03	Mix A
S90-2084	EK Lag - 04	Mix B

ANALYTICAL RESULTS

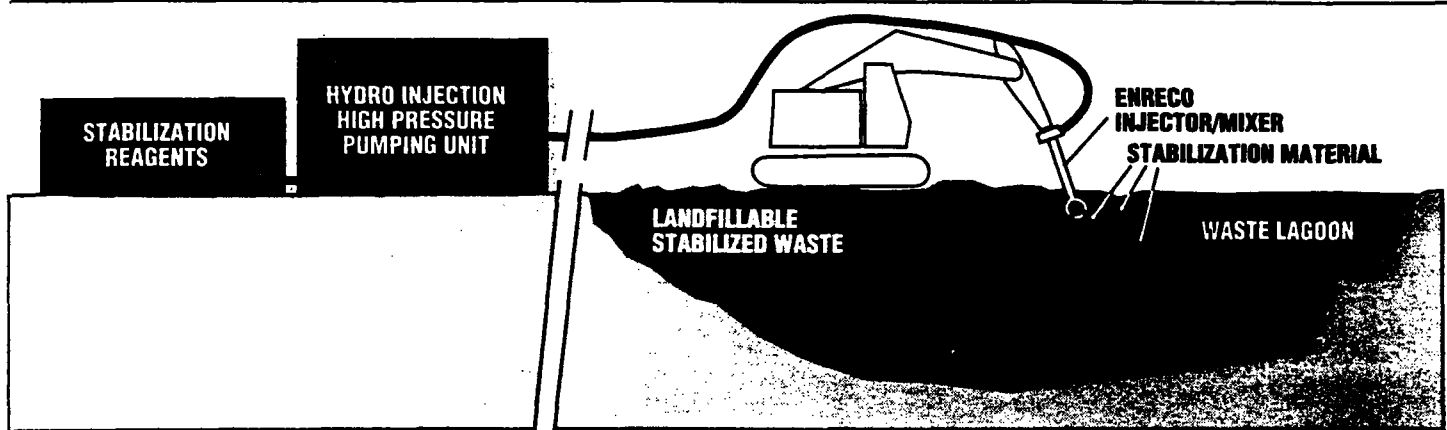
<u>Raw Sample</u>	<u>Mix A</u>	<u>Mix B</u>
Moisture Content (%)	35.2	34.2
Bulk Density (lb./ft. ³)	107.7	107.7
<u>Mixed Sample - Initial Mix</u>		
Moisture Content (%)	32.4	28.5
Bulk Density (lb./ft. ³)	111.2	109.2
<u>Mixed Sample - 7 Day Cure</u>		
Bulk Density (lb./ft. ³)	105.1	105.3
UCS (ASTM D2166) (lb./in. ²)	>53.4	36.4
Corrected Surface Area (in. ²)	9.5	9.6

The ENRECO Pug Mill System



TECHNICAL UPDATE

1 The ENRECO Hydro Injection System



ENRECO Incorporated has developed the new ENRECO Hydro Injection system for stabilization and solidification of hazardous and low level nuclear wastes. The process offers many advantages over conventional stabilization techniques. When stabilization reagents are delivered by the Hydro Injection system the benefits are:

- Dust free operations
- Higher production rates
- More efficient stabilization
- Potential for robotic delivery

The Hydro Injection System is inherently more efficient, allowing stabilization reagents to be pumped at high pressures over great distances to the waste site. Because of this, sensitive equipment and personnel can be placed well away from the actual stabilization site, greatly reducing the risks involved in highly toxic or low level nuclear waste site remediation.

With the Hydro Injection System, ENRECO can complete projects more safely, more quickly, with more efficient use of stabilization reagents and greatly reduce the amount of dust produced by conventional stabilization systems.

For more information on how the ENRECO Hydro Injection System can be utilized to meet waste remediation needs, contact the specialists in waste stabilization/solidification - ENRECO, Inc.



ENRECO

Corporate Offices
The Fisk Building
Amarillo, Tx. 79105
(806) 379-6424

Phoenix
51 W. Elliott Rd. St.105
Tempe Az. 85284
(602) 879-6029

Baltimore
2431 Crofton Ln. St.13A
Crofton, Md. 21114
(301) 721-5005

New Orleans
625 N. Old Highway 190
Mandeville, La. 70448
(504) 626-1066

Cincinnati
431 Ohio Pike #157 S.
Cincinnati, Oh. 45255
(513) 528-3525

ENRECO LABORATORIES

6661 - A Canyon Dr.
Amarillo, TX. 79110
(806) 353-4425

Custody No. 1984

Project Number W.O. # 90-02-04

Sampled By _____
Project Description Wagon / Ekco
Location _____

CHAIN OF CUSTODY RECORD

Sample Number	Date	Time	Matrix (s,w,f)	Composite	Grab	Sample Location	No. of containers	Analysis Required						Remarks (Preservation, Size/Amount, etc...)					
								Stabilization											
S90-2083	2/2	3:20	S			EK Lag - 03	1	✓											
S90-2084	2/2	3:20	S			EK Lag - 04	1	✓											
S90-2083	2/2					Stabilized Mix A	9	✓							3x6" plastic cylinder molds				
S90-2084	2/2					Stabilized Mix B	9	✓							" " " "				
Relinquished by: (Signature)						Date	Time	Received by: (Signature)						Relinquished by: (Signature)		Date	Time	Received by: (signature)	
Frank R. Robinson, Enreco						2/2/90	1500												
Relinquished by: (Signature)						Date	Time	Received by: (Signature)						Relinquished by: (Signature)		Date	Time	Received by: (signature)	
Relinquished by: (Signature)						Date	Time	Received by: (Signature)						Shipped/Delivered:		Date	Time		
Relinquished by: (Signature)						Date	Time	Received by: (Signature)						Remarks: 2/2/90 Sample material stored in Hazardous material storage room.					
Relinquished by: (Signature)						Date	Time	Received for Laboratory by: (Signature)						2/2/90 18 3x6" cylinders of stabilized material sent to Roy F. Weston, Inc. via UPS					
						2/2/90	3:20	Amelia Esman											

Distribution:

Client - Pink Copy
Report - Yellow Copy
Original - File

WESTON Analytics Use Only

Custody Transfer Record/Lab Work Request



Client EXCO
Work Order 2994-02-03
Date Rec'd. _____ Date Due _____
RFW Contact Bill CLENZANI vs Mergat
Client Contact/Phone 215-344-3666 OR 3665

Refrigerator#							
#/Type Container		3 gal					
Volume		white					
Preservative		—					
ANALYSES REQUESTED		% Moisture As Received	Bulk density After Mixing	% Moisture After Mixing	Bulk density After 7 days	UCC After 7 days	
Matrix	Date Collected						
Soil	1/3/90	X	X	X	X	X	
"	"	X	X	X	X	X	

Matrix:	W - Water	DS - Drum Solids	Special Instructions:
S - Soil	O - Oil	DL - Drum Liquids	
SE - Sediment	A - Air	F - Fish	
SO - Solid	WI - Wipe	X - Other	

[illegible]

WESTON Analytics
Use Only

Samples Were:
1 Shipped or Hand-Delivered
NOTES:

2 Ambient or Chilled
NOTES:

3 Received Broken/ Leaking (Improperly Sealed)	Y	N
--	---	---

NOTES:

4 Properly Preserved
Y N
NOTES:

5 Received Within
Holding Times
Y N

NOTES:

COC Tape Was:

1 Present on Outer Package	Y	N
2 Unbroken on Outer Package	Y	N
3 Present on Sample	Y	N
4 Unbroken on Sample	Y	N
NOTES:	Y	N

COC Record Was:

1 Present Upon Receipt
of Samples Y N

Discrepancies Between
Sample Labels and COC
Record? Y N

NOTES:

WESTON

APPENDIX C

HAMMON TREATABILITY STUDY REPORT



**Harmon
Environmental
Services, Inc.**

Environmental Contractors

March 5, 1990

Mr. Harold G. Byer, Jr.
Project Manager
Roy F. Weston, Inc.
Weston Way
West Chester, PA 19380

Dear Mr. Byer:

Enclosed is Harmon Environmental Services's "Qualification Package" to perform the stabilization of the cadmium, chromium, and lead contaminated sludge located at your clients facility in central Ohio. Harmon Environmental Services has a great deal of successful experience treating this type of inorganic contamination. The results of the TCLP leachate tests should confirm this ability. Harmon's knowledge and experience in the stabilization technologies, as well as heavy construction management, allows us the versatility to handle large, complex projects.

I would like to address each of the points of information that were requested in your letter of February 9:

- At this juncture in the project development process, Harmon Environmental Services normally does not reveal its additive and/or dosage rate. Harmon would be willing to discuss with you the nature of the additive but due to the proprietary nature of the additive, we are not willing to discuss additive and dosage rates in detail.
- See attached lab report for data obtained, but not requested.
- Harmon Environmental Services's HSSTM stabilization system can be utilized at this site. The HSSTM is a dozer mounted high energy mixing system using a 265 horsepower diesel driven power-pack to power the front-mounted mixers. The mixing system provides intimate contact between the sludge/soils and the determined additive, so that a complete and thorough stabilization is accomplished.

The additive is placed in a premeasured area for mixing with the material. The area and amount of material to be processed is determined by field testing that has been performed as part of Harmon Environmental Services's "Advance Quality Control Program (AQCP).

Corporate Office

1530 Alabama Street
Auburn, AL 36830
Phone (205) 821-9253
FAX (205) 826-0771

Branch Offices

Bldg. 3, Suite 208
Riverchase Office Plaza
Birmingham, AL 35244
Phone (205) 988-8305
FAX (205) 988-5249

P.O. Box 6378
Longview, TX 75608
Phone (214) 663-5850

Mr. Harold G. Byer, Jr.
March 5, 1990
Page Two

The area is mixed with the HSSTM unit either in-place or in a designated mixing area outside of the contaminated area. Once the material has been stabilized and has met all physical requirements, as designated in the closure plan, the material can be stockpiled or placed into a final disposal area. Confirmation of chemical acceptability is conducted following stabilization.

The area needed for the HSSTM system to process is approximately 50' x 250' or if site conditions allow, the material could be processed in-place. All additives will be brought to the site in bulkmatic trailers and pneumatically conveyed to the immediate work area.

An alternative to the HSSTM system would be for Harmon Environmental Services to erect a fixed stabilization unit that would consist of portable silos, weigh-belt feed conveyors, enclosed pugmill, and automatic controls. This unit can be utilized when the work area or site logistics require the material to be excavated and stockpiled. Once stockpiled, the material will be screened to remove miscellaneous debris. The weigh-belt conveyor and automated system ensure a proper dosage application and acceptable quality control.

Once the material has been processed, the stabilized soils and sludges can be placed and compacted in the excavated area or other designated location. The work area required for this system should be approximately 4,000 sq.ft.

Excavation activities will involve the removal of the material from the predetermined contaminated area. Harmon Environmental Services has in its arsenal various sized excavator and extended boom hoes to accomplish the most intricate of material removals. Harmon has first-hand practical experience excavating contaminated soils and sludges from below the water table.

- Pricing estimates for the two proposal systems are:

HSS TM	\$60/cy
Pugmill	\$66/cy

Mr. Harold G. Byer, Jr.
March 5, 1990
Page Three

These prices include mobilization, excavating, additive, processing, placement, and demobilization. Additional information regarding the site and additional treatability evaluation can be used to "firm-up" these prices.

After screening debris from the provided material, Harmon Environmental Services had approximately 3 gallons of material to evaluate. With the number of cylinders requested by Weston being 11, 3" x 6" molds, there was little freedom to evaluate a number of different additive (s) and dosage rates. We feel at this point the sample is overdosed in relation to the actual optimum rate. Further lab testing can develop this optimum rate.

Harmon Environmental Services has the technology and experience to handle difficult, complex stabilization projects. Our documented stabilization experience, engineering support, and heavy construction background allows Harmon to tackle the most difficult of situations. We appreciate being considered for Weston's review, and very much wish to pursue detailed discussions on performing the full-scale remediation.

If you have any question, please call me.

Sincerely,

HARMON ENVIRONMENTAL SERVICES, INC.



Frank J. Friday
Sales Manager-Northeast Region
Remediation Services Division

FJF:dpd
D2603

Enclosure



HARMON ENVIRONMENTAL SERVICES, INC.
Bench Scale Treatability
of Ohio Surface Impoundment Material

Preliminary Investigation

Presented To:

ROY F. WESTON, INC.
Weston Way
West Chester, PA 19380

March 6, 1990

Prepared By:

Harmon Environmental Services, Inc.

Environmental Contractors
5221 Militia Hill Road
Plymouth Meeting, Pennsylvania 19462 (215)825/8877

FINDINGS

Preliminary findings show that the waste material provided would be suitable for Harmon's High Solids Stabilization (HSSTM) system for in-place mixing/treatment with selected local stabilization reagents. The tabular data provided demonstrate the early (7 days of age) disposal properties achieved from the HSSTM system approach on a bench scale basis.

In accordance with Weston's request for bench scale testing, we provided precast cylindrical test samples for evaluation. The raw waste was first screened through a No.4 sieve before solidification. Thereafter, several batches of waste plus additive were prepared with a Hobart paddle mixer. The binder used was cementitious and the chemistry involved is well known (The actual type and ratio will remain proprietary until project award to Harmon). The thoroughly mixed composition was compacted into waxed 3 x 6 inch molds and placed in sealed containers for curing at ambient temperatures and subsequent tests. These tests included:

- mix density and consistency
- penetration resistance
- unconfined compressive strength
- percent volume increase

Table I presents these data.

We found that the affected soil can be easily solidified and compacted into a material that exhibits high strength and density with nominal volume increase.

MIX DESIGN QUALIFICATION

We performed this study within the time frame allowed. Ordinarily, we would do much more extensive screening of a larger number of additives including cost effective proprietary additives, using available data from leaching tests to select mix designs that met leaching requirements. Time constraints and insufficient raw sample quantity prevented us from performing this work in the usual fashion; we are sure that we have not found the optimum mix design. Also, when a 10^{-7} permeability coefficient is specified prior to testing of actual samples, it may increase actual project costs out of proportion to its long term value (our bench scale binder to waste ratio was higher than usual in order to meet this requisite criterion). Therefore, the Harmon mix design submitted to Weston is considered a preliminary "fast-track" response; additional formulation activity is recommended. Specifically, we would propose a thorough field sampling and lab testing program or "Advanced Quality Control Program" ("AQCP") for determining variability in chemical characteristics throughout the surface impoundment. This program would identify any necessary modifications to the preliminary stabilization mix design to meet the required stabilization objectives.

TABLE I

**BENCH SCALE TREATABILITY OF OHIO
SURFACE IMPOUNDMENT MATERIALS
HSS™ SYSTEM**

RAW WASTE CHARACTERISTICS

Bulk Density, pcf	100
Solids, wgt %	63%
Moisture, ASTM	58%
Description	Sandy silty soil with interstitial pasty sludge throughout
Leachability	ND

STABILIZED WASTE CHARACTERISTICS

Mix Design	AHG
Consistency	Plastic (clayey) soil
Density, pcf Compacted ⁽¹⁾	117
Penetration Resistance, tsf	
1 Day	> 4.5
7 Day	> > 4.5
UCS, ⁽²⁾ psi	
7 Day	490
Volume Increase	< 10%
Leachability	ND

ND - Not determined.

⁽¹⁾ - Specimens prepared in general accordance with ASTM D1632

⁽²⁾ - Per ASTM 1633, "Compressive Strength of Molded Soil-Cement Cylinders"

Page 1 of 1



HES Project No.: 2400 - Western

Please Print - Sampler's Name : Mark Mikula

Company: HES

Signature: Mark Wilkins

[illegible]

Additional Field Comments: *Cylinders cast on 2/23. Can be stripped at anytime.

Relinquished by:		Received by:		Date	Time
Print Name: Mark Mikula	Company: HES	Print Name: William J. CELENZA	Company: PFW	3/1/90	4:15
Signature: Mark Mikula		Signature: William J. Celenza			
Print Name:	Company:	Print Name:	Company:		
Signature:		Signature:			
Print Name:	Company:	Print Name:	Company:		
Signature:		Signature:			
COMMENTS: Hand del. to Weston (Bill Celenza) on 3/1/90		Received for laboratory by:			
		Print Name:			
		Signature:			

COMMENTS: Hand del. to Weston (Bill Celenza) on 3/1/90

INSTRUCTIONS

1. Client - please print name of party samples are originating from.
2. Site Location - street address, city and state of location where sample are originating from.
3. HES Project No. - specific project number assigned by HES.
4. Sampler's Name - please print the name(s) and company of the person(s) collecting the samples. Each must then sign the record.
5. Collector's Sample No. - unique number assigned by the collector.
6. Station No. - Number assigned to the sampling location, referred to in the sampling plan.
7. Sample Description - Describe the sample(s) completely, including a distinct name/location or type. (i.e., sulfuric acid drums #1-10, or soil from perimeter of tank #2, etc.)
8. Date/Times of Collection - record the date and time (in military hours, i.e., 1430 is 2:30 P.M.) each sample was collected.
9. Sample Type - record whether the type of sample taken was a composite, grab, wipe, etc.
10. Preservative - specify type of preservative employed for each sample (refer to tables found in either SW-846 or 600/4-79-020 for guidance).
11. No. of Containers - denote any splitting of samples necessary for proper analyte preservation.
12. Lab ID No. - number assigned by laboratory analyst for each sample received.
13. Analysis Required - specify the analyte(s) to be run for each sample.
14. Remarks - may be used for - safety precautions, special instructions, specific analysis, field measurements etc.
15. Additional field comments - not by field conditions, whether changes, etc. which may affect sample integrity.
16. Chain of Custody Chronicle - record the name, company, and signatures of all persons involved in the sample custody. Include the date and time of each transaction. A sample is under custody if:
 - 1) it is in your possession
 - 2) it is in your view, after being in your possession, or
 - 3) it was in your possession and you locked it up, or
 - 4) it is in a designated secure area, restricted to authorized personnel only.
17. Distribution - Original copy must accompany the samples; the Field Coordinator must retain a photo copy.

WESTON
MANAGERS DESIGNERS/CONSULTANTS

[illegible]

COC Record Was:	
1 Present Upon Receipt of Samples	Y N
Discrepancies Between Sample Labels and COC Record?	
	Y N
NOTES:	

WILSON

APPENDIX D

STC TREATABILITY STUDY REPORT

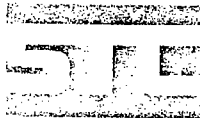
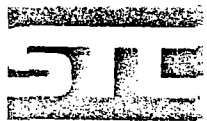


TABLE OF CONTENTS

Section 1	Executive Summary
Section 2	Treatability Study Description
Section 3	Analytical and Geotechnical Study Results
Section 4	Stabilization Treatment Process Description
Section 5	Construction Budget Estimates
Section 6	Stabilization/Fixation Mechanisms for Inorganic Wastes
Appendix	Custody Transfer Record

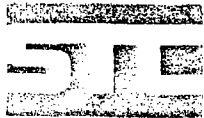
SECTION 1.0
EXECUTIVE SUMMARY



1.0 EXECUTIVE SUMMARY

Two samples identified as ECKLAG-07 and 08 were received by Silicate Technology Corporation (STC) on January 31, 1990 to perform a treatability study using stabilization/solidification technology. From the results of this treatability study the following observations were made:

1. The treated material from the composite of these two samples passed both the EPA TCLP leached test for F006 criteria.
2. The 50 psi unconfined compressive strength was met after a three (3) days curing time.
3. The volume change for the treated material as compared to the untreated soil was an increase of 8.3%.
4. Estimated treatment cost for construction and reagents based on this treatability study is \$64/ton.



SECTION 2.0
TREATABILITY STUDY DESCRIPTION

2.0 TREATABILITY STUDY DESCRIPTION

The goal of this study was to meet the following performance standards:

- Triaxial permeability less than 10^{-7} cm/sec.
- Unconfined compressive strength greater than 50 psi after a 28 day cure.
- TCLP leachate meeting F006 BDAT requirements.
- Low Cost.

2.1 Treatability Test Plan

There were six (6) phases to the treatability study:

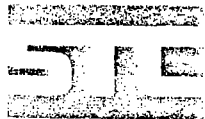
1. Sample Preparations
2. Mixing Initial Formulations
3. Curing and Final Formulation Selection Process
4. Selected Formulation Mixing Procedure
5. Analytical and Geotechnical Testing
6. Final Report

2.1.1 Sample Preparation

Before any treatment, samples were completely homogenized by using a mortar mixer. Two three (3) gallon plastic containers filled with soil were provided from each location. Prior to any treatment, a sample was collected for % moisture and bulk density determinations.

2.1.2 Initial Formulation Mixing Procedure:

1. Weighed out 300 grams of sample which represents each formulation into a kitchen aid mixing bowl.
2. Prepared formulations for each sample.
3. Add varying amounts of liquid activator and tap water for each formulation.
4. Turn the mixer on to a speed that does not create splattering from the mixing bowl. Allowed the mixture to mix for five (5) minutes.



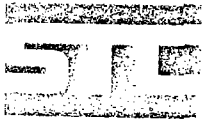
5. Add varying amounts of Soilsorb HM reagent to each formulation and mix for five (5) additional minutes.
6. Add additional tap water as necessary to provide a good mix. This is not a definite number. Enough water is necessary to provide for good mixing. If the waste is balling up in the mixer, more water is needed. If the waste is of a soup consistency, too much water has been added.
7. Record the amounts of liquid activator and reagents added to each formulation.
8. Allowed the treated material to mix for ten minutes. Utilize top speed of mixer that does not create splattering from the mixing bowl.
9. Place treated waste from the mixing bowls into curing molds.

2.1.3 Curing and Final Formulation Selection

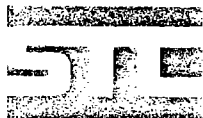
1. Allow treated material in molds to cure for 72 hours prior to testing for unconfined compressive strength (UCS), pH analysis, TCLP heavy metal analysis.
2. Selection criteria was based on the following analysis:
 1. pH < 12 units
 2. UCS > 50 psi after three days cure
 3. TCLP leachability meets F006 criteria
 4. Cost to be determined
3. Select a formulation for further testing based on cost effectiveness, compressive strength, and leachability analysis.

2.1.4 Selected Formulation Mixing Procedure

1. The selected formulation was mixed in accordance with section two (2) procedure. Except the sample size was increased to 6000 grams. The Hobart mixer was used instead of the Kitchen Aid.
2. The treated sample was then placed into six (6) inch curing molds.



SECTION 3
ANALYTICAL AND GEOTECHNICAL
TESTING RESULTS



3.0 ANALYTICAL AND GEOTECHNICAL TESTING RESULTS

Listed below are analytical and geotechnical results for the untreated and selected treated sample received January 31, 1990. The samples were treated with fixative reagents from Silicate Technology Corporation to immobilize heavy metals. These samples were allowed to cure 72 hours prior to leachability analysis. These results are as follows:

Untreated

TCLP¹ (mg/L)

<u>Lead</u>	<u>Chromium</u>	<u>Cadmium</u>	<u>Nickel</u>
0.47	0.15	3.54	0.24

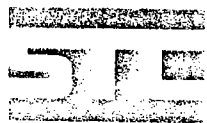
Total² (mg/L)

<u>Lead</u>	<u>Chromium</u>	<u>Cadmium</u>	<u>Nickel</u>
4070	940	577	92.3

Treated

TCLP

<u>Lead</u>	<u>Chromium</u>	<u>Cadmium</u>	<u>Nickel</u>
0.12	0.053	0.057	0.064



3.1 Geotechnical Testing

Untreated

% moisture	30.2
Bulk density	82.7 lb./ft ³

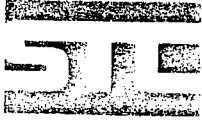
Treated

Initial % moisture	47.8
% moisture after 7 days cured	26.7
Bulk density	99.3 lb./ft ³
Unconfined compressive strenght greater than 50 psi after three (3) days cure.	
Volume Change %	+8.3



Footnotes

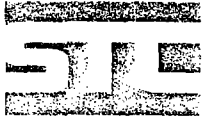
1. TCLP - Toxicity Characteristic Leaching Procedure
Federal Register Vol. 51, No. 216, November 7, 1986
2. Total Digestion Method SW846, Method No. 3050



SECTION 4.0
STABILIZATION TREATMENT
PROCESS

4.0 STABILIZATION TREATMENT PROCESS

Process begins by excavating the contaminated soil and stockpiling near the treatment area. The waste is then delivered to a screen hopper by a front-end loader. The pre-treated coarse materials are screened or crushed which reduces the particle size for effective interaction with the reagents. The pre-treated soils are conveyed to a pug mill, cement mixing trucks or other large scale mixing apparatus. The meter reagents and wastes are mixed thoroughly. After mixing, the treated waste exhibits the consistency of a wet, pourable cement. The treated wastes are transported to either an on-site disposal cell or lined roll-off boxes for eventual off-site disposal. Samples are taken for verification analysis after materials and reagents have been mixed prior to disposal or transported off-site for verification purposes. In section 5.0 a stabilization treatment estimate is provided. This estimate is based on a throughput of 500 yards per day. This is a conservative estimate. STC in the past has averaged 1000 yards per day with this equipment after set-up.



SECTION 5.0
CONSTRUCTION BUDGET ESTIMATES



5.0 TYPICAL CONSTRUCTION BUDGET SUMMARY ESTIMATE

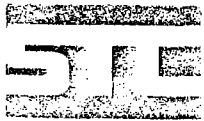
EQUIPMENT - See Section 5.1	\$ 7,150 p/day
MATERIAL - STC SOILSORB HM	\$ 300 p/ton
LIQUID ACTIVATOR	\$ 4.00/gal.
OTHER DIRECT COSTS Mobilization/Demobilize	10% of Job ¹
GASOLINE/OIL EXPENSE - See Section 5.2	\$ 142 p/day
LABOR COSTS - See Section 5.3	\$ 1,430 p/day
PER DIEM EXPENSES	\$ 630 p/day
<u>DELAYS NOT CAUSED BY STC SHALL BE CHARGED ON 1/2 RATE COST</u>	
DAILY ESTIMATED CONSTRUCTION, LABOR AND PER DIEM COSTS	\$ 13,100 p/day

¹ An initial 10% of total project costs (which is part of the total cost) would be required prior to job start for equipment and labor mobilization.

TOTAL ESTIMATED STABILIZATION COSTS FOR THE FOLLOWING AREAS:
See Section 5.6

Estimated Treatment and Reagent costs: \$64/ton

Grading activities not related to excavation, treatment and placement of stabilized such as over-excavation, cuts and fills, and drainage control \$8.00/ton.

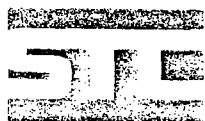


5.1 EQUIPMENT SUMMARY

Mobil Mini	\$ 50/Day
[2] 1/2 TON PICKUP, TRUCKS/25 each	\$ 50/Day
[] Portable office, lab & toilet facilities	\$ 500/Day
[1] TRACTOR LOADER	\$ 600/Day
[1] TRACTOR BACKHOE	\$ 600/Day
[1] MOBIL BATCH PLANT	\$2500/Day
[1] PORTABLE GANG TOOL BOXES W/ TOOLS	\$ 50/Day
[1] CEMENT MIX TRUCK or PUG MILL	\$1500/Day
[1] LOT TYVEK SUITS, GLOVES, RESPIRATORS, ETC.	\$ 150/Day
[1] GRINDER/SCREENER	\$1000/Day
[2] 2 TON CHAIN FALLS	Included
[2] 2 TON RACHET COMEALONG	Included
[4] 7/8" x 20' CHAIN W/HOOKS	Included
[1] BUILDERS LEVEL TRANSIT	Included
[2] 1 TON CABLE COMEALONGS JACK HOIST	Included
[1] FORKLIFT	\$ 150/Day
[LOT] MISC OUTSIDE CONTRACT RENTAL	Included

ESTIMATED DAILY TOTAL

\$ 7150.00



5.2 GASOLINE & OIL EXPENSES

	<u>TIME UNITS</u>	<u>COST</u>
2 PICK-UP TRUCKS		\$17.00
BACKHOE		25.00
988 CAT FRONT END LOADER		25.00
Cement Mix Truck		25.00
Batch Plant		<u>50.00</u>
<u>TOTAL</u>		<u>\$142 p/day</u>

5.3 LABOR SUMMARY

<u>JOB DESCRIPTION</u>	<u>HOURLY RATE</u>	<u>HOURS</u>	<u>COST</u>
PROJECT MANAGER	\$80	12	\$960
FIELD SUPERINTENDENT	60	12	720
FIELD ENGINEER AND HEALTH & SAFETY OFFICER	60	12	720
Field Personnel			
A	30	12	360
B	30	12	360
MIX TRUCK OPERATOR	40	12	480
BACKHOE OPERATOR	40	12	480
LOADER OPERATOR	40	12	480
BATCH PLANT OPERATOR	50	12	<u>600</u>
<u>TOTAL COSTS</u>			<u>\$5160 p/day</u>

Per Diem Expenses

9 Personnel @ \$70/Day \$630.00/day

NOTE: All on-site personnel have fulfilled the required 40 hour 29CFR 1910.120 health and safety training.



5.4 TOTAL ESTIMATED STABILIZATION (Includes excavation, stockpiling, treatment and on-site disposal)

ASSUMPTIONS

1. Conversion factor 1 cy = 1.2 tons
2. Estimated Treatment Rate 500 cy/day. This is a conservative estimate - In the past with this equipment STC has treated 1000 cy/day.

Based on these assumptions the costs for remediation are calculated at:

A. Time Required:

10 working days for mobilization and demobilization plus stabilization activities.

B. Total equipment, labor and per diem costs:

1. Equipment	\$7150/day
2. Labor	5160/day
3. Gas & Oil Expenses	142/day
4. Per Diem	<u>630/day</u>

\$13,082/day

500 cy/day basis:

26.16/cy
or \$21.80/Ton

5.5 REAGENT COST ESTIMATES

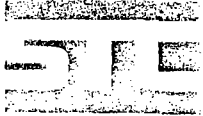
The selected formulation for this sample consist of 1% liquid activator and 11% Soilsorb HM reagent.

The estimated cost are as follows:

Soilsorb HM	
11% x \$300/ton	\$33.00/ton
Liquid Activator	
1% x 2000 lb = 20 lbs x 8.8 gal.	
2.27 gal. x \$4.00/gal.	<u>\$ 9.09/ton</u>
Total estimated reagent costs	
to treat a ton of waste	\$42.09

5.6 TOTAL ESTIMATED COSTS FOR BOTH TREATMENT AND REAGENTS

Reagent Costs	\$42.09/ton
Treatment Costs	<u>21.80/ton</u>
Total	\$63.89/ton



SECTION 6.0
STABILIZATION/FIXATION MECHANICS
OF
INORGANIC WASTES

STC TREATMENT PROCESS DESCRIPTION

FOR

INORGANIC WASTES CONTAINING TOXIC HEAVY METALS

The following description of the STC treatment process contains proprietary information on the mechanism of immobilization of contaminants in organic hazardous wastes. This information is portected as confidential information by STC and parts of this information are the subject of current or future patent applications. This data contains details on our proprietary three step contaminant immobilization mechanism but we cannot reveal specific treatment chemical formulation data for competitive reasons. While the following information may be submitted to regulatory agencies, it is not to be made public information without the express approval of STC.

1.0 OVERVIEW OF THE STC INORGANIC HAZARDOUS WASTE TREATMENT PROCESS.

The STC hazardous waste treatment process depends on three basic steps. These are, in order of occurrence:

- o PHASE I. Formation of relatively insoluble compounds involving the metal contaminants of concern. The reactants are typically metal hydroxides or metal oxides (typical of F006 electroplating sludge or K061 arc dust) an an STC reagent in solution form. The reaction products are typically relatively non-leachable sludges and slurries. This is a relatively simple inorganic chemical reaction.
- o PHASE II. Hydration of the STC treatment reagent and resulting solidification of the waste mass. The reactants in this hydration reaction are the above formed relatively insoluble compounds and the STC treatment reagent in powder form. The reaction products are typically non-leachable solids. This is a relatively complex hydration reaction which is analogous to the hydration of cement.

- o PHASE III. Microencapsulation of the above reaction products in a high strength monolith. As the above discussed hydration process continues for days and months, the STC treatment reagent enmeshes the treated wastes in a silicate matrix and encapsulates them. The end result of this reaction is a low permeability, high strength and extremely low leachable monolith.

2.0 DESCRIPTION OF CHEMICAL REACTIONS INVOLVED IN THE FORMATION OF INSOLUBLE CHEMICAL COMPOUNDS - PHASE I REACTION.

The formation of insoluble compounds in the PHASE I reaction represents the most proprietary part of the STC technology because it is so simple to implement and so effective in immobilizing toxic heavy metals. It will soon be the subject of a new STC patent application. This phase of our technology is based on our personnel's years of experience in the design of advanced industrial wastewater treatment processes for the electroplating and semiconductor industry.

As in the chemical treatment of industrial wastewaters, the treatment of hazardous wastes requires that a treatability study be performed to determine which treatment reagents to be added. STC has developed a set of PHASE I treatment reagents (referred to as "Liquid Activators") which are used for specific heavy metal contaminants. These various STC Liquid Activator reagents are selected for a specific waste based on a review of waste analysis data and a treatability test.

The Liquid Activator reagent reacts with heavy metal contaminants to form highly insoluble heavy metal compounds. This reaction prevents these heavy metals from interfering with the subsequent STC hydration reaction. Simple cement type treatment processes frequently are unable to even solidify some heavy metal wastes because of interference in the cement hydration by heavy metals.

To simplify field operations, STC has developed a broad spectrum liquid reagent, referred to Liquid Activator S-3, to treat most types of F006 electroplating wastes and K061 arc dust wastes. While we cannot discuss the exact formulation of S-3, it functions to form compounds much more insoluble than heavy metal hydroxides or oxides. It is not a sodium or potassium silicate as is included in some competitors formulations. It is a totally inorganic formulation that forms extremely stable chemical compounds when mixed with electroplating sludge or arc dust.

While the S-3 Liquid Activator can handle most electroplating or acr dust wastes, there are some limiations. For F006 wastes, electroplating wastes from processes utilizing electroless plating operations containing high amounts of chelating compounds may be difficult to treat using the standard STC formulations. Some high pH electrolytic plating baths and cleaning compounds may also contain chelating compounds. Chelating compounds such as EDTA and tartrates are utilized to keep metals such as copper and nickel from precipitating at high pH from an electroless plating bath. Electroless plating processes are used primarily to plate metals or plastic or aluminum substrates - somthing that a conventional acidic electrolytic plating bath cannot do.

3.0 DESCRIPTION OF THE CHEMICAL REACTIONS INVOLVED IN THE HYDRATION REACTION - PHASE II REACTION.

The hydration reactions involved in the STC treatment process are directly analogous to the hydration of Portland cement. We cannot give specific details on the compounds involved in the hydration reaction because of the need to protect proprietary information. However, the end products of the reaction are primarily calcium aluminum silicates. These compounds are extremely stable compounds which do not break down in natural or landfill environments.

The hydration reaction involves the previously formed insoluble heavy metal compounds and a dry powdered STC reagent referred to as Toxsorb HM or Soilsorb HM. The initial hydration reaction is complete in 24 to 48 hours and results in a solid material. The leachability of the treated waste is now within BDAT standards.

If the solidification of the waste in Phase II proceeds at an unusually slow rate, it may be indicative of ineffective Phase I treatment or of an interference from high levels of zinc or copper in the waste. High levels of zinc or copper react with the solidification agent and reduce the strength of the treated waste. Fortunately, both Soilsorb and Toxsorb can handle the levels of zinc and copper typically found in electroplating sludge and arc dust.

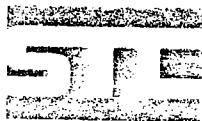
The basic STC treatment process can handle low amounts of anionic contaminants such as hexavalent chromium or cyanide compounds found in electroplating sludge or anionic forms of arsenic (such as arsenates) found in pesticide wastes. Higher amounts of these anionic contaminants require process modifications such as oxidative pretreatment for cyanide or the addition of anionic exchange/adsorption compounds for arsenic. STC utilizes a magnesium aluminum oxide compound developed by Alcoa for the treatment of some anionic contaminants. This material is blended with our dry reagents and mixed in one step. It is selective for certain anionic compounds such as arsenates and can render them non-leachable.

4.0 DESCRIPTION OF THE CHEMICAL REACTIONS INVOLVED IN THE MICROENCAPSULATION REACTION - PHASE III REACTION.

The STC Phase III reaction is directly analogous to a Pozzolan reaction in that it is a slow on-going reaction which forms complex metal silicate and aluminate compounds. These silicate compounds are analogous to many naturally occurring silicate compounds (rock forming silicates) which are extremely stable compounds. The stability of compounds formed by Pozzolan reactions is demonstrated by the stability of ancient Pozzolan cement structures dating back thousands of years (many Roman buildings used Pozzolan cements).

No additional reagents are added for the Phase III reaction. Phase III is simply a long term Pozzolan reaction of the components already present in the treated waste. It is demonstrated by the slow improvement in leachability and strength of STC treated wastes with time. For this reaction to proceed, the waste mass must remain moist or wet. This is not a problem in a typical landfill environment.

STC treated waste will meet BDAT standards after the Phase II reaction. The Phase III reaction simply provides an even higher factor of safety in leachability with time. The Phase III reaction also increases the compressive strength and decreases the permeability of the treated waste. Even though the Phase II treated waste is broken up when it is dumped into a landfill, the slow Phase III reaction will tend to re-cement the treated waste together in the landfill and will result in a high strength, low permeability, non-leachable monolith of treated waste. Thus, the end result of the STC treatment process is a block of treated waste which more than meets BDAT standards and has the added protection against leaching of low permeability and low surface area of the solidified monolith. This combination of factors provides redundant safeguards against environmental releases of contaminants.




Appendix

Custody Transfer Record



Client BLK
Work Order 2994-02-03
Date Rec'd. _____ Date Due _____
RFW Contact B. CELENZA/GUS Neugebauer
Client Contact/Phone 215-344-7666 ext 3665

WA Use Only Lab ID	Client ID/Description
-----------------------	-----------------------

Refrigerator#						
#/Type Container		2				
Volume		3gal				
Preservative		—				
ANALYSES REQUESTED 		% moisture As Received	Bulk density After Nitrating	% moisture After Mixing	Bulk density After 1 days	LC's After 1 days
Matrix	Date Collected					
Sul	1/2/90	X	X	X	X	X
"	"	X	X	X	X	X

Matrix:	W - Water	DS - Drum Solids	Special Instructions:
S - Soil	O - Oil	DL - Drum Liquids	
SE - Sediment	A - Air	F - Fish	
SO - Solid	WI - Wipe	X - Other	

WESTON Analytics
Use Only

Samples Were:
1 Shipped or Hand-Delivered
NOTES:

2 Ambient or Chilled
NOTES:

3 Received Broken/
Leaking (Improperly
Sealed)

Y N
NOTES:

4 Properly Preserved
Y N

NOTES:

5 Received Within
Holding Times

NOTES:

COC Tape Was:

1 Present on Outer Package	Y	N
2 Unbroken on Outer Package	Y	N
3 Present on Sample	Y	N
4 Unbroken on Sample	Y	N
NOTES:	Y	N

COC Record Was:

1 Present Upon Receipt
of Samples Y N

Discrepancies Between
Sample Labels and COC
Record? Y N

NOTES:

WESTON

APPENDIX E

WESTON TREATABILITY STUDY REPORT

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

WASTE STABILIZATION STUDY - MIX DESIGN TEST DATA

PROJECT	ECKO HOUSEWARES	PROJECT WASTE NAME	EKLAG-C	MIX CODE	WESTON 2
JOB NUMBER	900201	ETL WASTE NUMBER	001	ANALYST	RWF
W.O. NUMBER	2994-02-03-0019			MIX DATE	3/7/90

WASTE STABILIZATION MIX DATA

Mix Fraction	Description	Mix Fraction Percentages				Unit Weight g/ml	Total Solids %	Mix Fraction Quantities			
		Weight			Volume			Weight, g			Volume,ml
		Dry	D/W	Wet	Wet			Dry	D/W	Wet	Wet
Waste	Soil-Metals	70.0	50.2	78.5	83.3	0.90	63.9	4068.5	4068.5	6364.0	7071.1
Stabilizer 1	Cement Kiln Dust	30.0	21.5	21.5	25.1	0.82	99.9	1743.7	1743.7	1746.1	2132.0
Stabilizer 2	None	0.0	0.0	0.0	0.0	1.00	0.0	0.0	0.0	0.0	0.0
Added Water	None	--	0.0	0.0	0.0	1.00	0.0	--	0.0	0.0	0.0
Natural Water	Adsorbed	--	28.3	--	--	1.00	0.0	--	2297.9	--	--
Total Fresh Mix	W/S ratio=1.317886	100.0	100.0	100.0	108.4	0.96	72.7	5812.2	8110.1	8110.1	8492.3
		% Net Weight Increase Over Original Waste Weight									27.4
		% Net Volume Increase Over Original Waste Volume-uncompacted mix									20.1
		% Net Volume Increase Over Original Waste Volume-compacted mix									-33.3

TEST CYLINDER DATA

Test Mold Number	Test Day	Test Date	Type of Mixing Compaction or Curing	Empty Mold Weight g	Mix & Mold Weight g	Mold Dimensions			Wet Unit Weight pcf	Total Solids %	Other Tests
						Diameter cm	Height cm	Vol. ml			

WESTON 2-3	28	04/04/90	cured @ 100% RH and 78 degrees F	67.37	1004.46	7.60	12.08	548	106.7	--	UCS,TCLP
WESTON 2-4	28	04/04/90		69.27	1027.45	7.62	12.32	562	106.4	77.1	UCS
WESTON 2-5	28	04/04/90		68.50	1014.63	7.60	12.54	569	103.8	76.3	UCS
WESTON 2-6	28	04/04/90		68.24	1010.22	7.63	12.20	558	105.4	--	PERM
WESTON 2-7	28	04/04/90		67.94	1021.87	7.60	12.30	558	106.7	--	HOLD
WESTON 2-8	28	04/04/90		68.85	1010.44	7.60	12.20	554	106.1	--	HOLD
Average									105.8	76.7	

NOTES

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

WASTE STABILIZATION STUDY - MIX DESIGN TEST DATA

PROJECT	ECKO HOUSEWARES	PROJECT WASTE NAME	EKLAG-C	MIX CODE	WESTON 1
JOB NUMBER	900201	ETL WASTE NUMBER	001	ANALYST	RWF
W.O. NUMBER	2994-02-03-0019			MIX DATE	3/7/90

WASTE STABILIZATION MIX DATA

Mix Fraction	Description	Mix Fraction Percentages				Unit Weight g/ml	Total Solids %	Mix Fraction Quantities			
		Weight			Volume			Weight, g			Volume,ml
		Dry	D/W	Wet	Wet			Dry	D/W	Wet	Wet
Waste	Soil-Metals	80.0	55.1	86.2	91.0	0.90	63.9	5235.2	5235.2	8189.0	9098.9
Stabilizer 1	Cement Kiln Dust	20.0	13.8	13.8	16.0	0.82	99.9	1309.2	1309.2	1311.0	1600.7
Stabilizer 2	None	0.0	0.0	0.0	0.0	1.00	0.0	0.0	0.0	0.0	0.0
Added Water	None	--	0.0	0.0	0.0	1.00	0.0	--	0.0	0.0	0.0
Natural Water	Adsorbed	--	31.1	--	--	1.00	0.0	--	2955.6	--	--
Total Fresh Mix	W/S ratio=2.257628	100.0	100.0	100.0	107.0	0.95	70.6	6544.4	9500.0	9500.0	10000.0
		% Net Weight Increase Over Original Waste Weight									16.0
		% Net Volume Increase Over Original Waste Volume-uncompacted mix									9.9
		% Net Volume Increase Over Original Waste Volume-compacted mix									-40.0

TEST CYLINDER DATA

Test Mold Number	Test Day	Test Date	Type of Mixing Compaction or Curing	Empty Mold Weight g	Mix & Mold Weight g	Mold Dimensions			Wet Unit Weight pcf	Total Solids %	Other Tests
						Diameter cm	Height cm	Vol. ml			
WESTON 1-1	0	03/07/90	hand mixed and compacted using standard proctor compactive effort	67.74	1083.20	7.60	12.70	576	110.0	--	
WESTON 1-2	0	03/07/90		67.65	1023.79	7.60	12.06	547	109.0	--	
WESTON 1-3	0	03/07/90		70.07	1068.92	7.60	12.65	574	108.6	--	
WESTON 1-4	0	03/07/90		69.81	1086.17	7.62	13.02	594	106.8	--	
WESTON 1-5	0	03/07/90		68.57	1084.15	7.62	13.10	597	106.1	--	
WESTON 1-6	0	03/07/90		69.25	1034.70	7.62	12.00	547	110.1	--	
WESTON 1-7	0	03/07/90		68.85	1021.32	7.60	12.00	544	109.2	--	
WESTON 1-8	0	03/07/90		68.67	1021.35	7.60	12.00	544	109.2	--	
Average									108.6	70.6	

WESTON 1-1	7	03/14/90	cured @100%RH & 78 degrees F	67.74	1075.96	7.60	12.70	576	109.2	73.8	UCS
WESTON 1-2	7	03/14/90		67.65	1018.03	7.60	12.06	547	108.4	73.2	UCS
Average									108.8	73.5	

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

WASTE STABILIZATION STUDY - MIX DESIGN TEST DATA

PROJECT	ECKO HOUSEWARES	PROJECT WASTE NAME	EKLAG-C	MIX CODE	WESTON 1
JOB NUMBER	900201	ETL WASTE NUMBER	001	ANALYST	RWF
W.O. NUMBER	2994-02-03-0019			MIX DATE	3/7/90

WASTE STABILIZATION MIX DATA

Mix Fraction	Description	Mix Fraction Percentages				Unit Weight g/ml	Total Solids %	Mix Fraction Quantities			
		Weight			Volume			Weight, g			Volume,ml
		Dry	D/W	Wet	Wet			Dry	D/W	Wet	Wet
Waste	Soil-Metals	80.0	55.1	86.2	91.0	0.90	63.9	5235.2	5235.2	8189.0	9098.9
Stabilizer 1	Cement Kiln Dust	20.0	13.8	13.8	16.0	0.82	99.9	1309.2	1309.2	1311.0	1600.7
Stabilizer 2	None	0.0	0.0	0.0	0.0	1.00	0.0	0.0	0.0	0.0	0.0
Added Water	None	--	0.0	0.0	0.0	1.00	0.0	--	0.0	0.0	0.0
Natural Water	Adsorbed	--	31.1	--	--	1.00	0.0	--	2955.6	--	--
Total Fresh Mix	W/S ratio=2.257628	100.0	100.0	100.0	107.0	0.95	70.6	6544.4	9500.0	9500.0	10000.0
		% Net Weight Increase Over Original Waste Weight									16.0
		% Net Volume Increase Over Original Waste Volume-uncompacted mix									9.9
		% Net Volume Increase Over Original Waste Volume-compacted mix									-40.0

TEST CYLINDER DATA

Test Mold Number	Test Day	Test Date	Type of Mixing Compaction or Curing	Empty Mold Weight g	Mix & Mold Weight g	Mold Dimensions			Wet Unit Weight pcf	Total Solids %	Other Tests
						Diameter cm	Height cm	Vol. ml			
WESTON 1-3	28	04/04/90	cured @ 100% RH and 78 degrees F	70.07	1063.22	7.60	12.65	574	108.0	--	UCS,TCLP
WESTON 1-4	28	04/04/90		69.81	1081.96	7.62	13.02	594	106.4	75.9	UCS
WESTON 1-5	28	04/04/90		68.57	1080.52	7.62	13.10	597	105.7	75.5	UCS
WESTON 1-6	28	04/04/90		69.25	1030.02	7.62	12.00	547	109.5	--	PERM
WESTON 1-7	28	04/04/90		68.85	1017.33	7.60	12.00	544	108.7	--	HOLD
WESTON 1-8	28	04/04/90		68.67	1017.25	7.60	12.00	544	108.7	--	HOLD
Average									107.8	75.7	

NOTES

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

WASTE STABILIZATION STUDY - MIX DESIGN TEST DATA

PROJECT	ECKO HOUSEWARES	PROJECT WASTE NAME	EKLAG-C	MIX CODE	WESTON 2
JOB NUMBER	900201	ETL WASTE NUMBER	001	ANALYST	RWF
W.O. NUMBER	2994-02-03-0019			MIX DATE	3/7/90

WASTE STABILIZATION MIX DATA

Mix Fraction	Description	Mix Fraction Percentages				Unit Weight g/ml	Total Solids %	Mix Fraction Quantities			
		Weight			Volume			Weight, g			Volume, ml
		Dry	D/W	Wet	Wet			Dry	D/W	Wet	Wet
Waste	Soil-Metals	70.0	50.2	78.5	83.3	0.90	63.9	4068.5	4068.5	6364.0	7071.1
Stabilizer 1	Cement Kiln Dust	30.0	21.5	21.5	25.1	0.82	99.9	1743.7	1743.7	1746.1	2132.0
Stabilizer 2	None	0.0	0.0	0.0	0.0	1.00	0.0	0.0	0.0	0.0	0.0
Added Water	None	--	0.0	0.0	0.0	1.00	0.0	--	0.0	0.0	0.0
Natural Water	Adsorbed	--	28.3	--	--	1.00	0.0	--	2297.9	--	--
Total Fresh Mix	W/S ratio=1.317886	100.0	100.0	100.0	108.4	0.96	72.7	5812.2	8110.1	8110.1	8492.3
% Net Weight Increase Over Original Waste Weight											27.4
% Net Volume Increase Over Original Waste Volume-uncompacted mix											20.1
% Net Volume Increase Over Original Waste Volume-compacted mix											-33.3

TEST CYLINDER DATA

Test Mold Number	Test Day	Test Date	Type of Mixing Compaction or Curing	Empty Mold Weight g	Mix & Mold Weight g	Mold Dimensions			Wet Unit Weight pcf	Total Solids %	Other Tests
						Diameter cm	Height cm	Vol. ml			
WESTON 2-1	0	03/07/90	hand mixed and compacted using standard proctor compactive effort	69.46	1021.55	7.60	12.04	546	108.8	--	
WESTON 2-2	0	03/07/90		67.36	1024.17	7.60	12.22	554	107.7	--	
WESTON 2-3	0	03/07/90		67.37	1008.37	7.60	12.08	548	107.1	--	
WESTON 2-4	0	03/07/90		69.27	1038.27	7.62	12.32	562	107.6	--	
WESTON 2-5	0	03/07/90		68.50	1034.66	7.60	12.54	569	106.0	--	
WESTON 2-6	0	03/07/90		68.24	1016.44	7.63	12.20	558	106.1	--	
WESTON 2-7	0	03/07/90		67.94	1030.19	7.60	12.30	558	107.6	--	
WESTON 2-8	0	03/07/90		68.85	1020.13	7.60	12.20	554	107.2	--	
Average									107.3	72.7	

WESTON 2-1	7	03/14/90	cured @100%RH & 78 degrees F	69.46	1014.24	7.60	12.04	546	107.9	76.2	UCS
WESTON 2-2	7	03/14/90		67.36	1013.08	7.60	12.22	554	106.4	75.7	UCS
Average									107.2	76.0	

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

PROJECT	ECKO HOUSEWARES	TEST MOLD	WESTON1-1	DATE	3/14/90
W.O. NO.	2994-02-03-0019	PROVING RING #	PR-15	ANALYST	RWF

TEST MOLD DATA

Initial Dimensions				Mold Preparation	Mold Description
Diameter inches	Length inches	Area sq inch	Lo/D Ratio		
2.99	5.00	7.02	1.67	none, used cold capping system	dark grey brittle rough surface, coarse interior with blue-green crystals

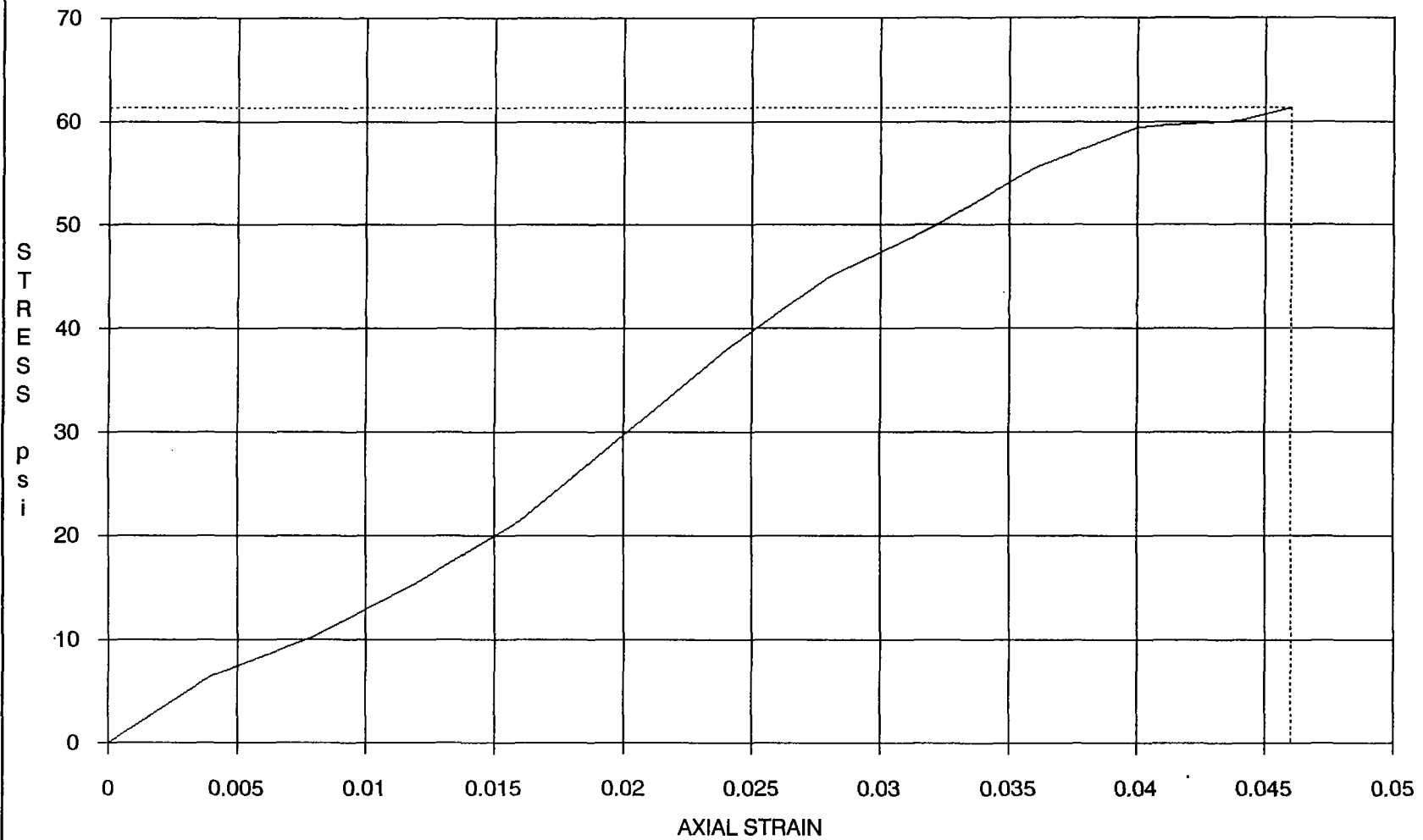
STRESS/STRAIN DATA

[illegible]

ULTIMATE	230	470	0.230	0.4	0.046	7.36	431	61.4	
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UNCONFINED COMPRESSIVE STRENGTH

ECKO HOUSEWARES PROJECT TEST MOLD WESTON1-1



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

PROJECT	ECKO HOUSEWARES	TEST MOLD	WESTON1-2	DATE	3/14/90
W.O. NO.	2994-02-03-0019	PROVING RING #	PR-15	ANALYST	RWF

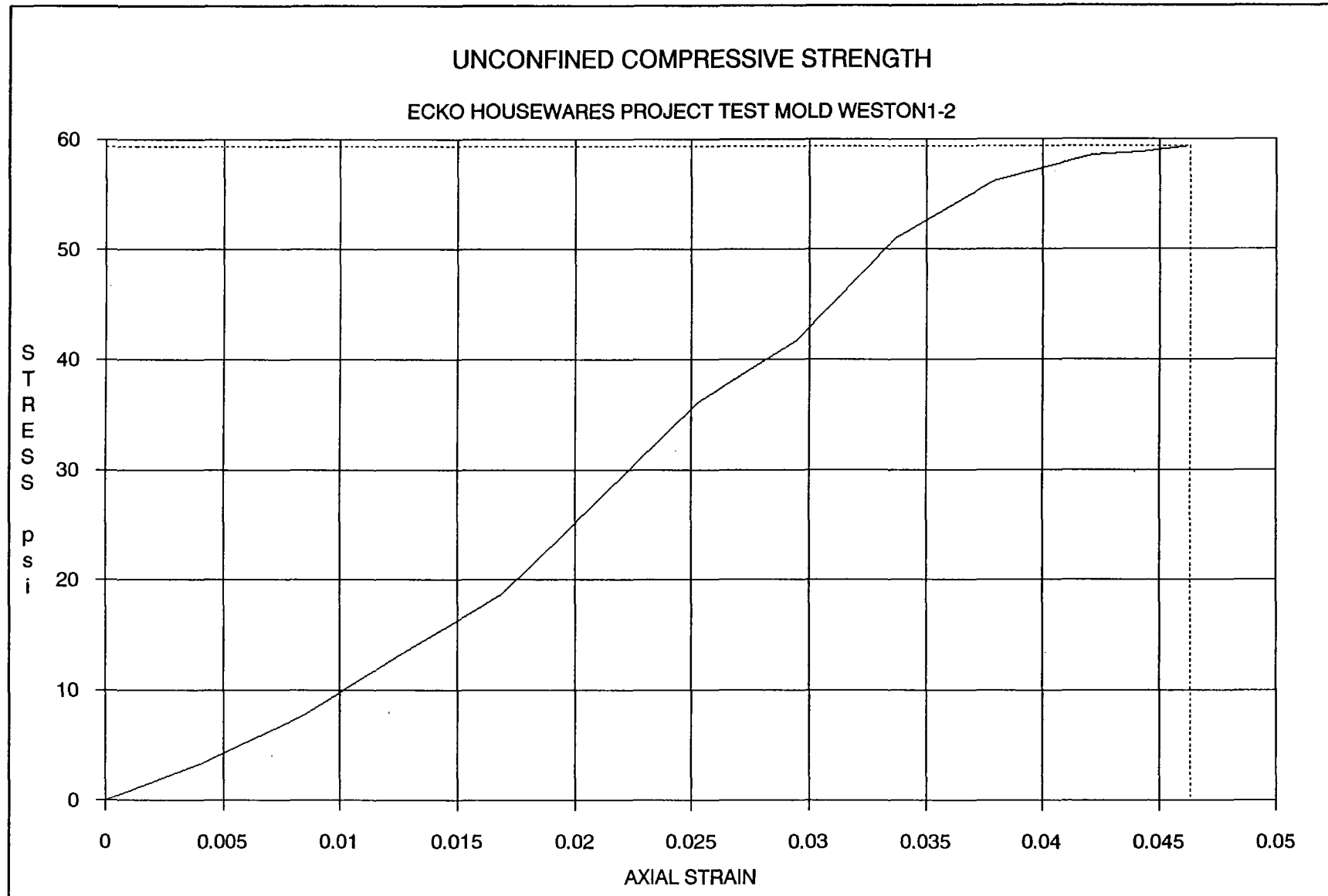
TEST MOLD DATA

Initial Dimensions				Mold Preparation	Mold Description
Diameter inches	Length inches	Area sq inch	Lo/D Ratio		
2.99	4.75	7.02	1.59	none, used cold capping system	dark grey brittle rough surface, coarse interior with blue-green crystals

STRESS/STRAIN DATA

[illegible]

ULTIMATE	220	454	0.220	0.4	0.046	7.36	416	59.3	
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WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

PROJECT	ECKO HOUSEWARES	TEST MOLD	WESTON2-1	DATE	3/14/90
W.O. NO.	2994-02-03-0019	PROVING RING #	PR-15	ANALYST	RWF

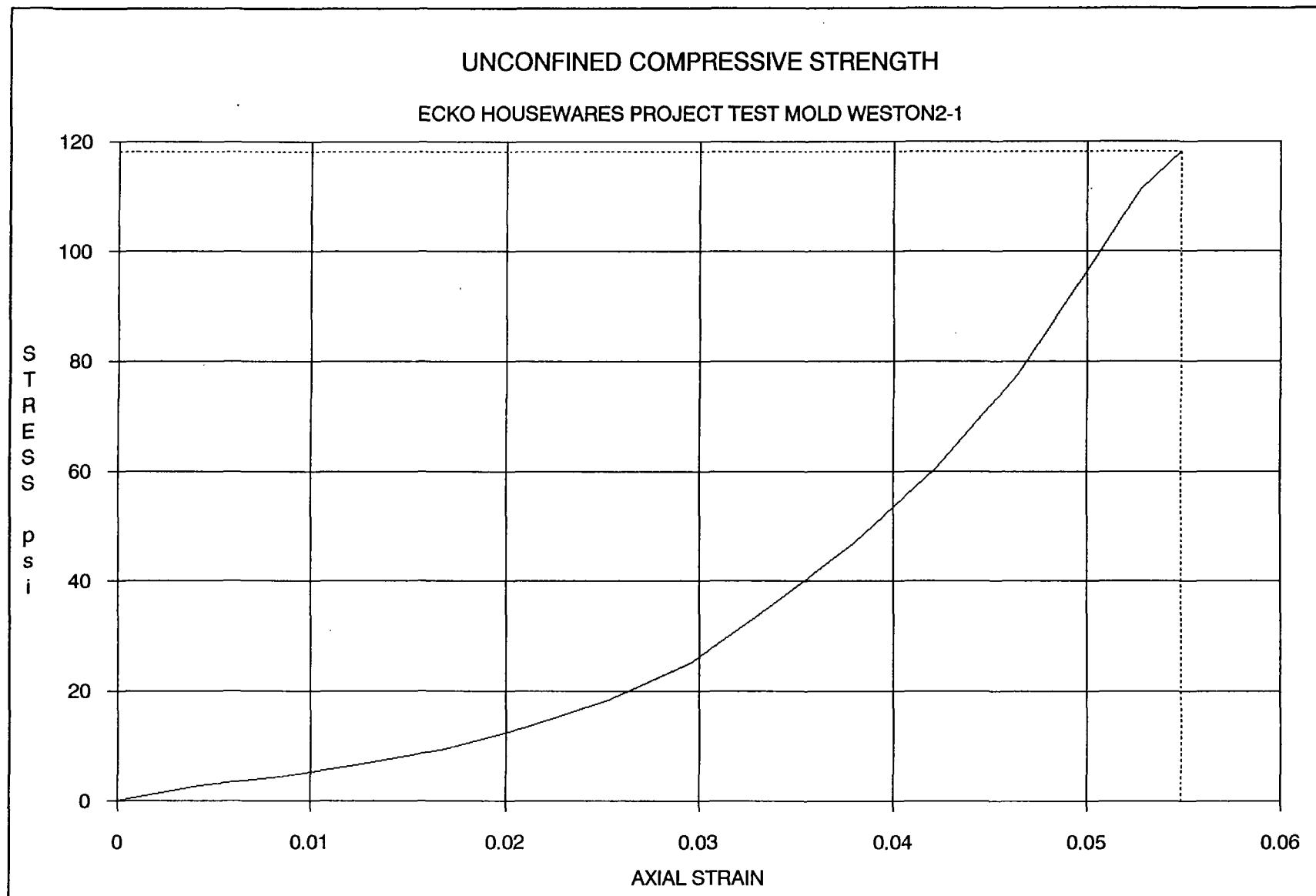
TEST MOLD DATA

Initial Dimensions				Mold Preparation	Mold Description
Diameter inches	Length inches	Area sq inch	Lo/D Ratio		
2.99	4.74	7.02	1.59	none, used cold capping system	dark grey brittle rough surface, coarse interior with blue-green crystals

STRESS/STRAIN DATA

[illegible]

ULTIMATE	260	812	0.260	0.4	0.055	7.43	829	118.1	
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WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

PROJECT	ECKO HOUSEWARES	TEST MOLD	WESTON2-2	DATE	3/14/90
W.O. NO.	2994-02-03-0019	PROVING RING #	PR-15	ANALYST	RWF

TEST MOLD DATA

Initial Dimensions				Mold Preparation	Mold Description
Diameter inches	Length inches	Area sq inch	Lo/D Ratio		
2.99	4.81	7.02	1.61	none, used cold capping system	dark grey brittle rough surface, coarse interior with blue-green crystals

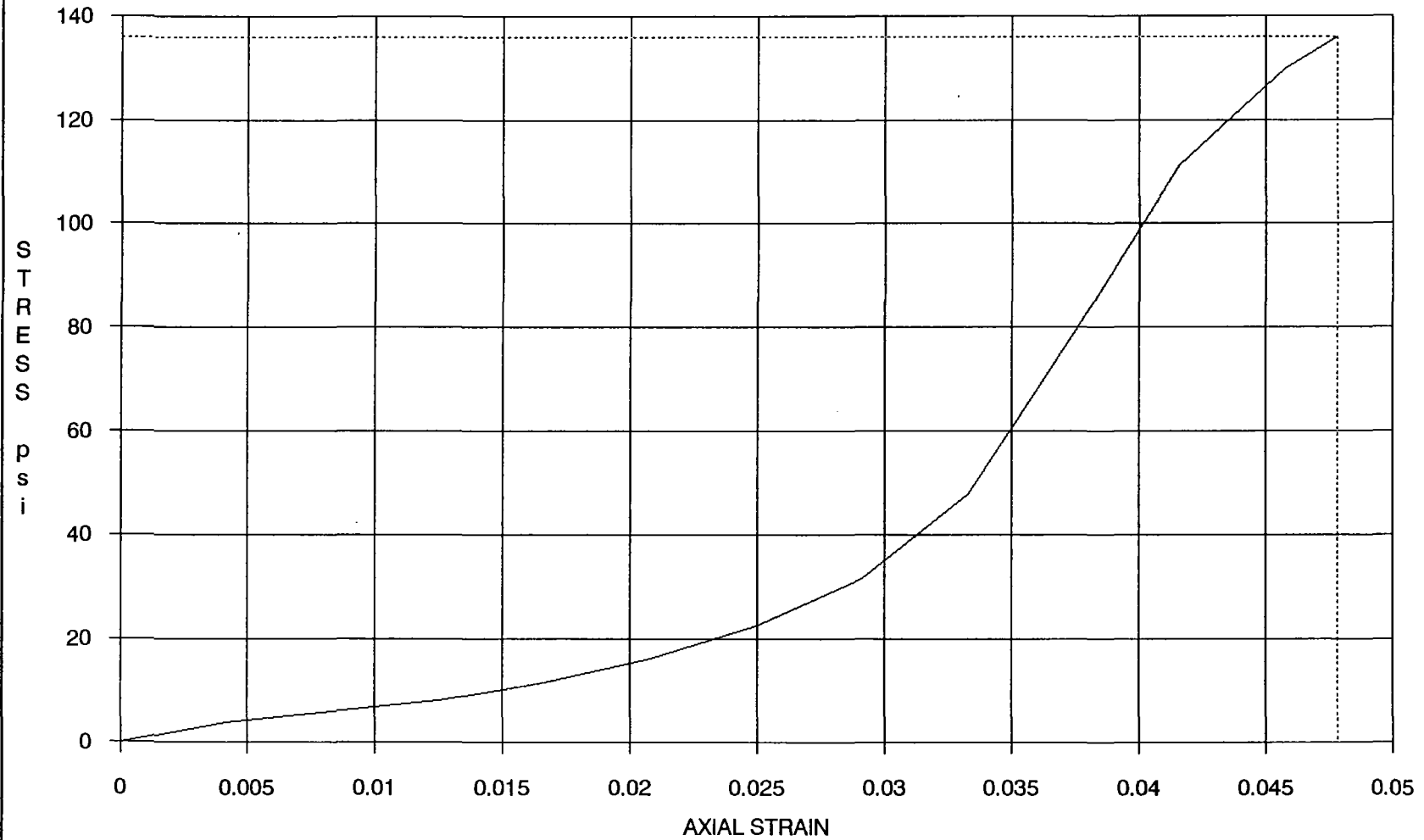
STRESS/STRAIN DATA

[illegible]

ULTIMATE	230	870	0.230	0.4	0.048	7.37	954	135.9	
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UNCONFINED COMPRESSIVE STRENGTH

ECKO HOUSEWARES PROJECT TEST MOLD WESTON2-2





APPENDIX F

TREATED SOIL GEOTECHNICAL TESTING REPORT

**TREATED SOIL
PERMEABILITY TEST RESULTS**

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

PROJECT	ECKO HOUSEWARES	TEST MOLD	ENRICO A-1	DATE	3/7/90
W.O. NO.	2994-02-03-0019	PROVING RING #	PR-15	ANALYST	RWF

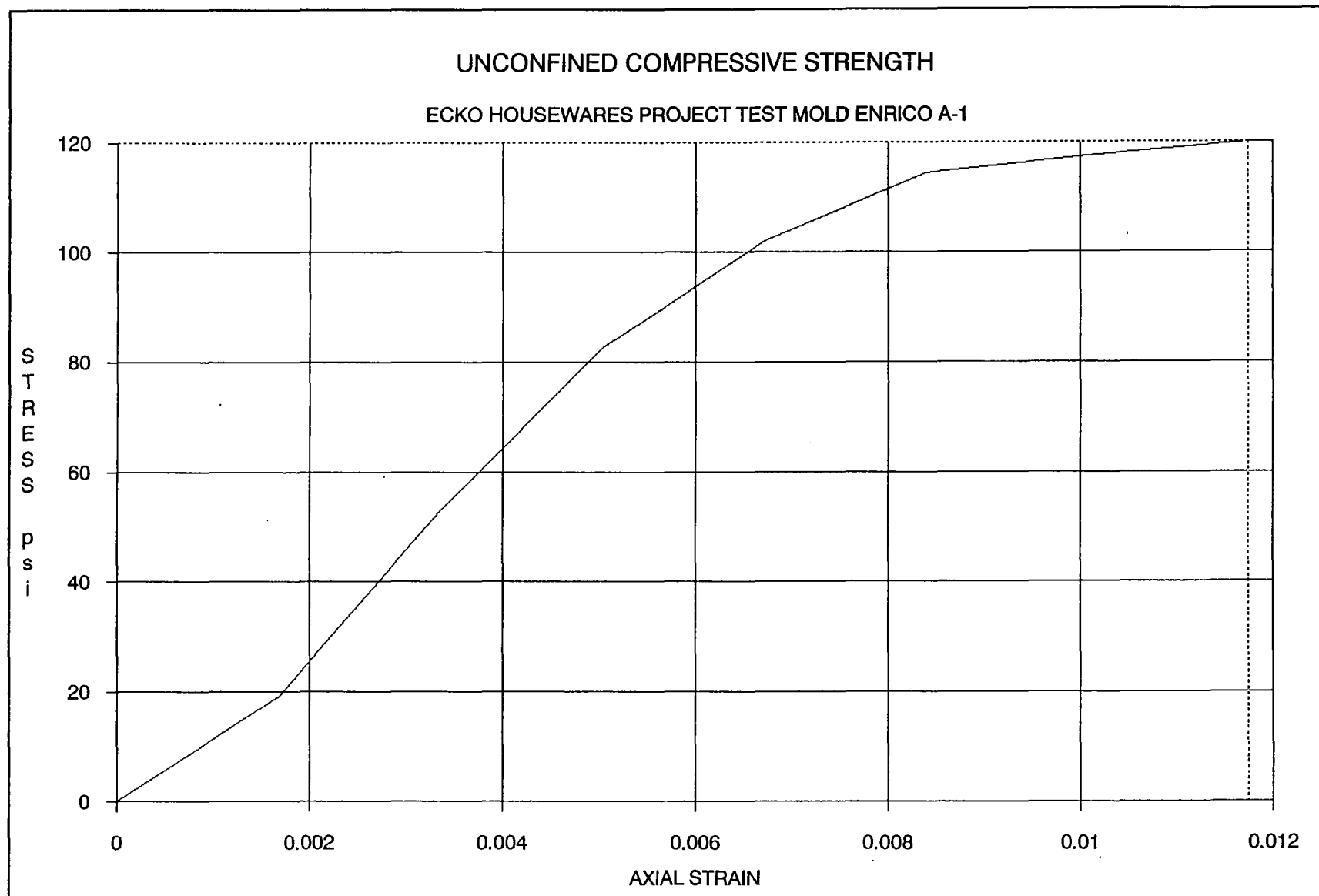
TEST MOLD DATA

Initial Dimensions				Mold Preparation	Mold Description
Diameter inches	Length inches	Area sq inch	Lo/D Ratio		
2.99	5.96	7.02	1.99	none, used cold capping system	grey brown firm smooth surface, coarse interior with blue green crystals

STRESS/STRAIN DATA

[illegible]

ULTIMATE	70	818	0.070	0.3	0.012	7.10	842	119.9	
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WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

PROJECT	ECKO HOUSEWARES	TEST MOLD	ENRICO A-2	DATE	3/7/90
W.O. NO.	2994-02-03-0019	PROVING RING #	PR-15	ANALYST	RWF

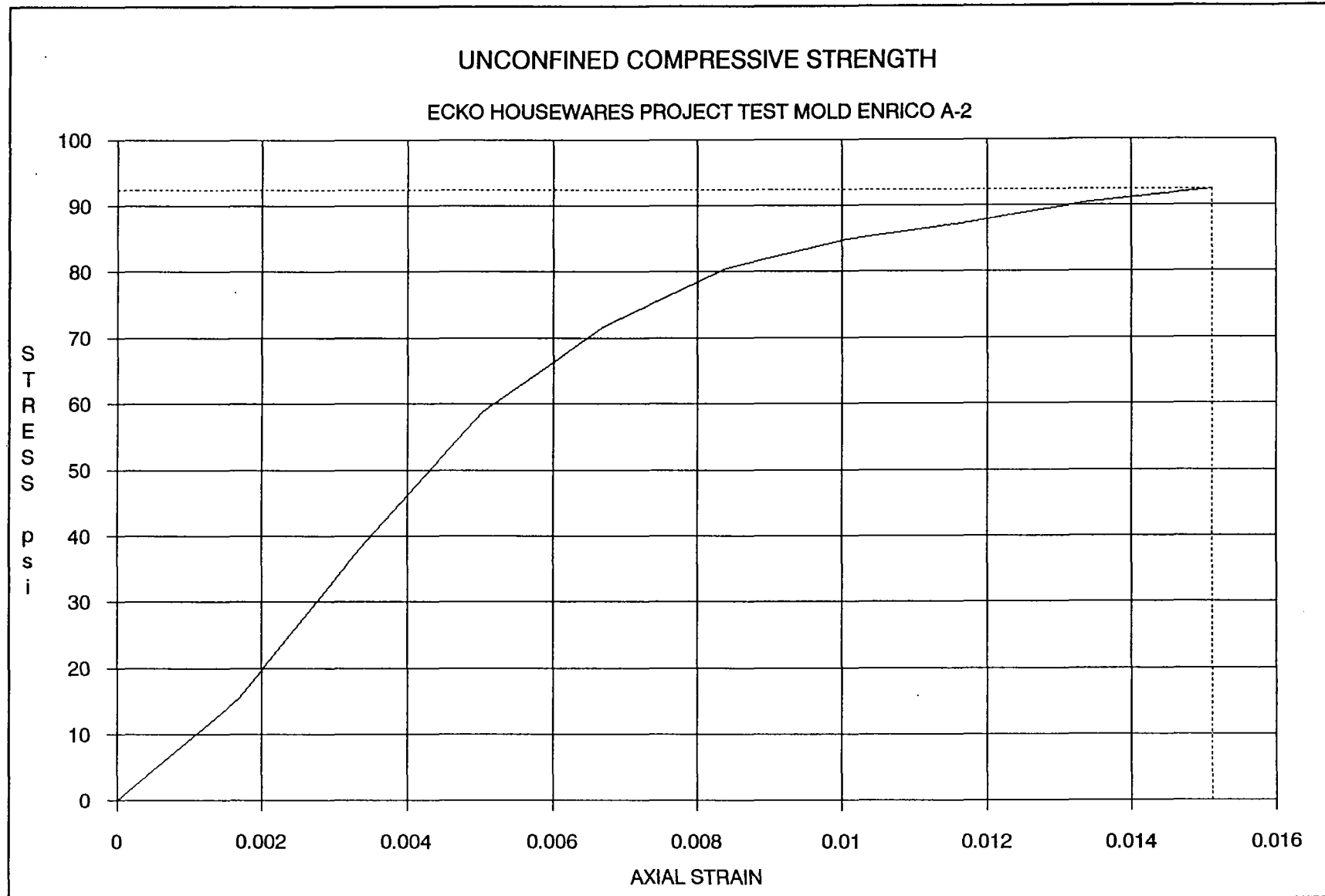
TEST MOLD DATA

Initial Dimensions				Mold Preparation	Mold Description
Diameter inches	Length inches	Area sq inch	Lo/D Ratio		
2.99	5.96	7.02	1.99	none, used cold capping system	grey brown firm smooth surface, coarse interior with blue green crystals

STRESS/STRAIN DATA

[illegible]

ULTIMATE	90	710	0.090	0.3	0.015	7.13	649	92.4	
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WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

PROJECT	ECKO HOUSEWARES	TEST MOLD	ENRICO A-3	DATE	3/7/90
W.O. NO.	2994-02-03-0019	PROVING RING #	PR-15	ANALYST	RWF

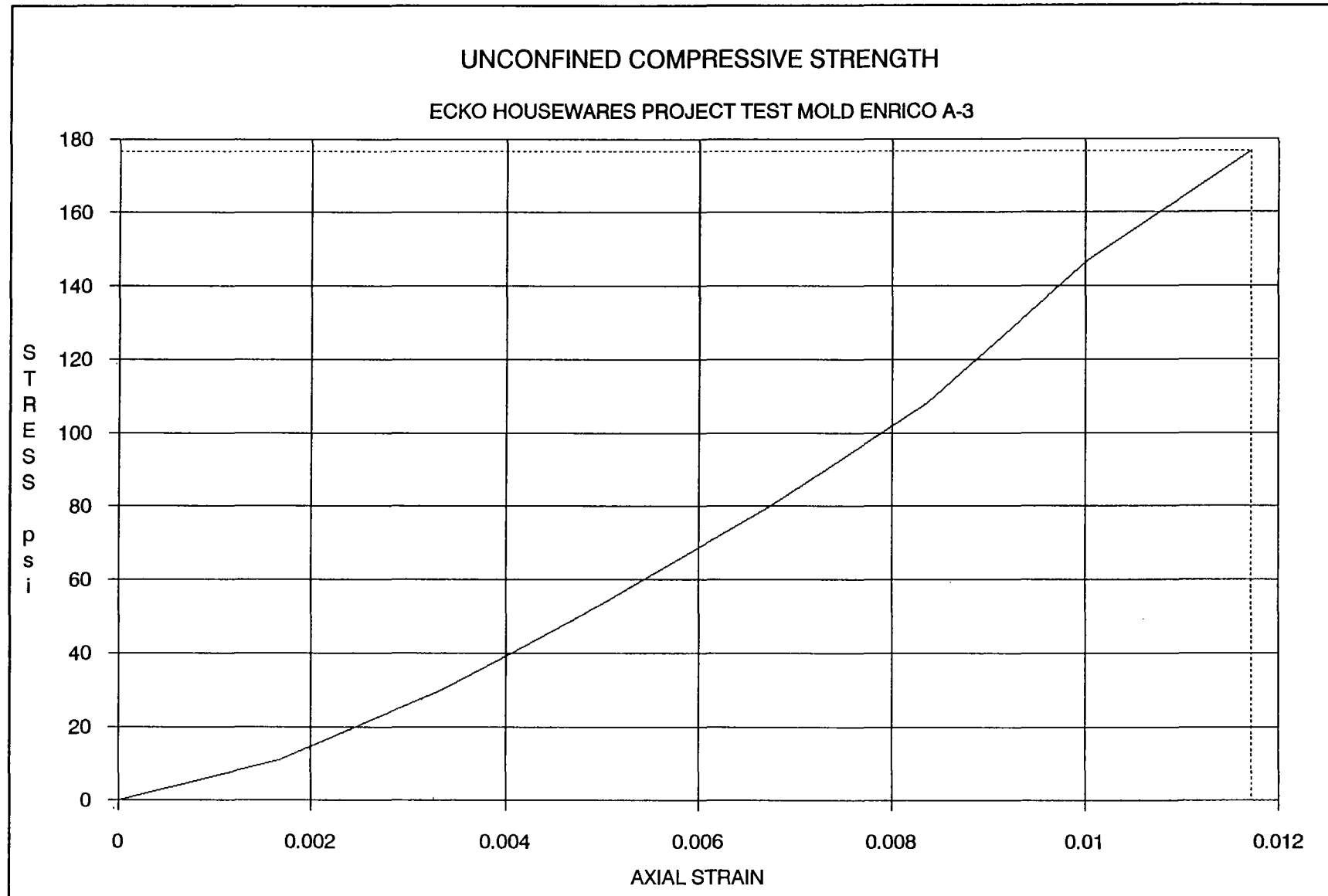
TEST MOLD DATA

Initial Dimensions				Mold Preparation	Mold Description
Diameter inches	Length inches	Area sq inch	Lo/D Ratio		
2.97	5.98	6.93	2.01	none, used cold capping system	grey brown firm smooth surface, coarse interior with blue green crystals

STRESS/STRAIN DATA

[illegible]

ULTIMATE	70	995	0.070	0.3	0.012	7.01	1224	176.7	
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WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

PROJECT	ECKO HOUSEWARES	TEST MOLD	ENRICO B-1	DATE	3/7/90
W.O. NO.	2994-02-03-0019	PROVING RING #	PR-15	ANALYST	RWF

TEST MOLD DATA

Initial Dimensions				Mold Preparation	Mold Description
Diameter inches	Length inches	Area sq inch	Lo/D Ratio		
2.97	5.91	6.93	1.99	none, used cold capping system	grey green firm smooth surface, coarse interior with blue green crystals

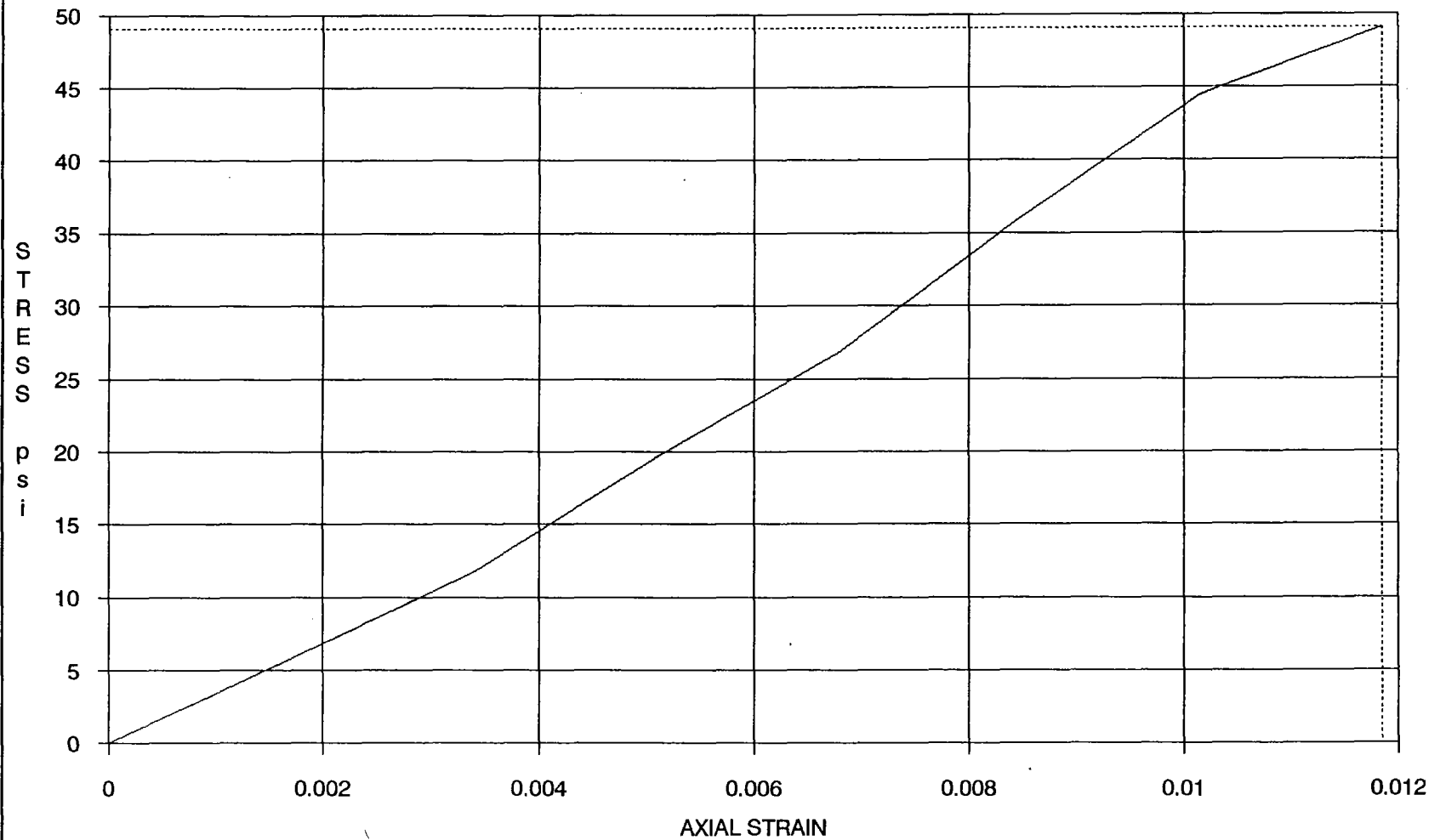
STRESS/STRAIN DATA

[illegible]

ULTIMATE	70	370	0.070	0.3	0.012	7.01	340	49.1	
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UNCONFINED COMPRESSIVE STRENGTH

ECKO HOUSEWARES PROJECT TEST MOLD ENRICO B-1



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

PROJECT	ECKO HOUSEWARES	TEST MOLD	ENRICO B-2	DATE	3/7/90
W.O. NO.	2994-02-03-0019	PROVING RING #	PR-15	ANALYST	RWF

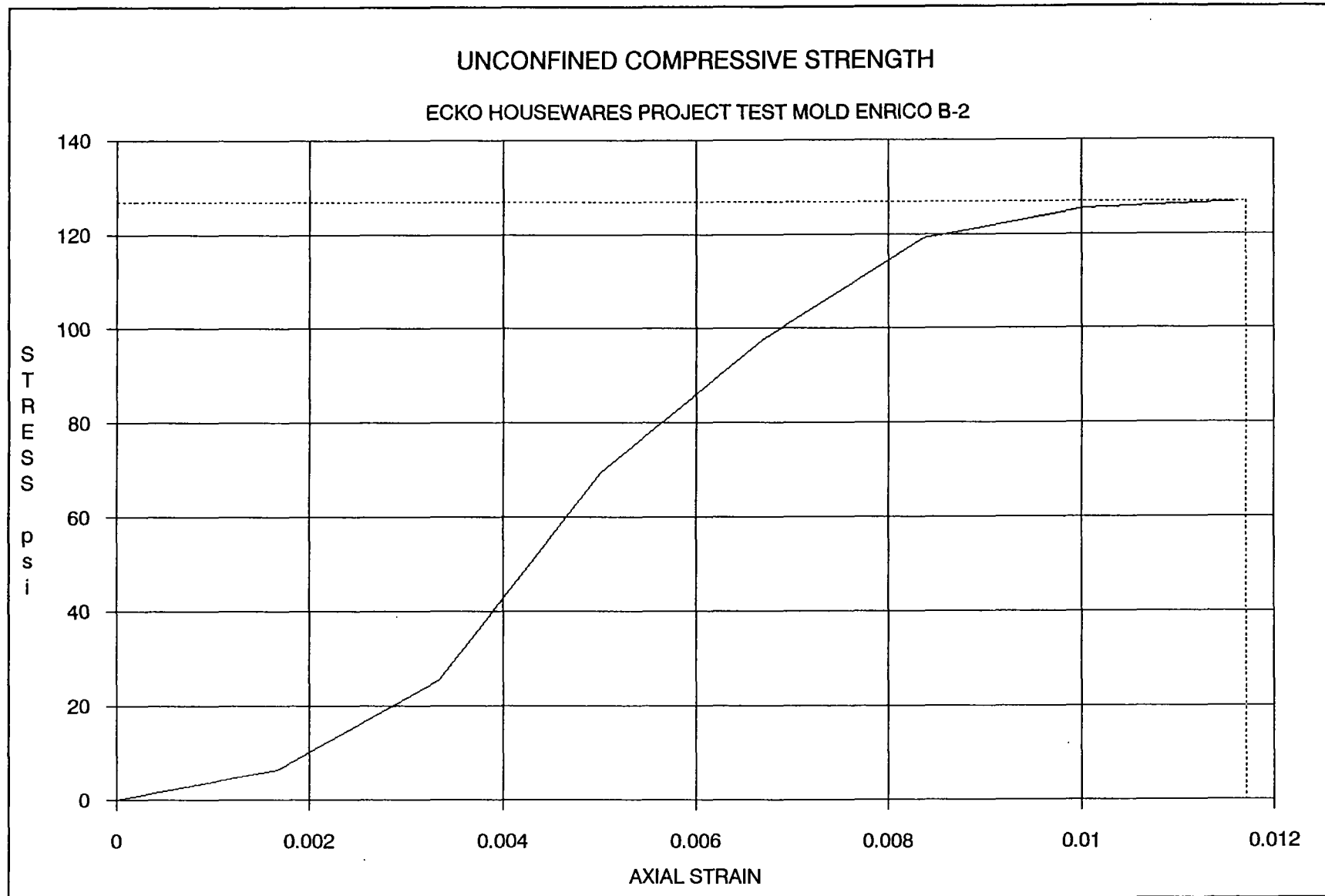
TEST MOLD DATA

Initial Dimensions				Mold Preparation	Mold Description
Diameter inches	Length inches	Area sq inch	Lo/D Ratio		
2.97	5.98	6.93	2.01	none, used cold capping system	grey green firm smooth surface, coarse interior with blue green crystals

STRESS/STRAIN DATA

[illegible]

ULTIMATE	70	835	0.070	0.3	0.012	7.01	879	126.9	
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WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

PROJECT	ECKO HOUSEWARES	TEST MOLD	ENRICO B-3	DATE	3/7/90
W.O. NO.	2994-02-03-0019	PROVING RING #	PR-15	ANALYST	RWF

TEST MOLD DATA

Initial Dimensions				Mold Preparation	Mold Description
Diameter inches	Length inches	Area sq inch	Lo/D Ratio		
2.97	5.98	6.93	2.01	none, used cold capping system	grey green firm smooth surface, coarse interior with blue green crystals

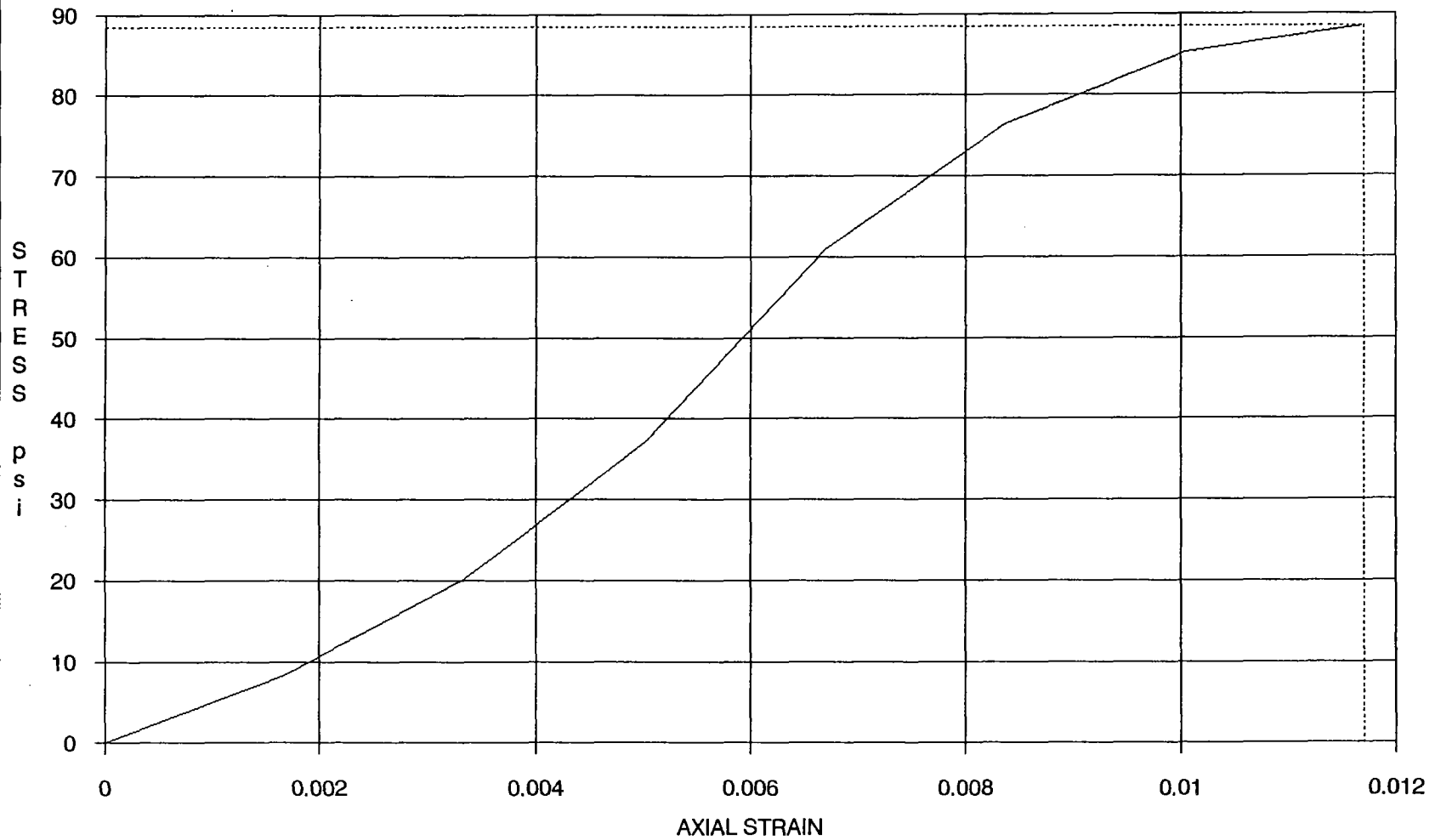
STRESS/STRAIN DATA

[illegible]

ULTIMATE	70	670	0.070	0.3	0.012	7.01	613	88.4	
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UNCONFINED COMPRESSIVE STRENGTH

ECKO HOUSEWARES PROJECT TEST MOLD ENRICO B-3



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

PROJECT	ECKO HOUSEWARES	TEST MOLD	HARMON AHG-1	DATE	3/23/90
W.O. NO.	2994-02-03-0019	PROVING RING #	PR-15	ANALYST	RWF

TEST MOLD DATA

Initial Dimensions				Mold Preparation	Mold Description
Diameter inches	Length inches	Area sq inch	Lo/D Ratio		
2.95	5.98	6.83	2.03	none, used cold capping system	grey green firm smooth surface, coarse interior, moist dense, plastic

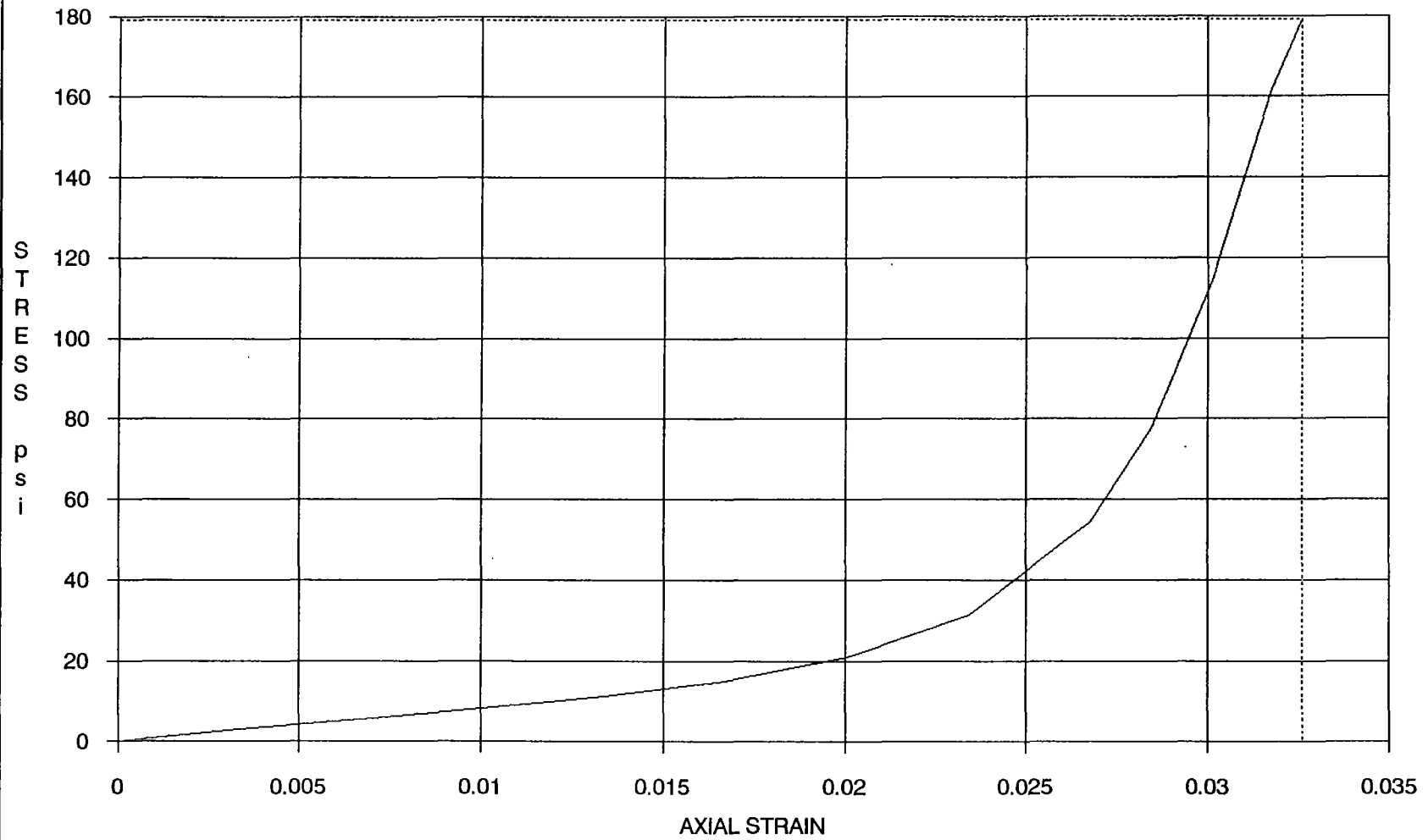
STRESS/STRAIN DATA

[illegible]

ULTIMATE	195	995	0.195	0.2	0.033	7.07	1224	179.1	
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UNCONFINED COMPRESSIVE STRENGTH

ECKO HOUSEWARES PROJECT TEST MOLD HARMON AHG-1



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

PROJECT	ECKO HOUSEWARES	TEST MOLD	HARMON AHG-2	DATE	3/23/90
W.O. NO.	2994-02-03-0019	PROVING RING #	PR-15	ANALYST	RWF

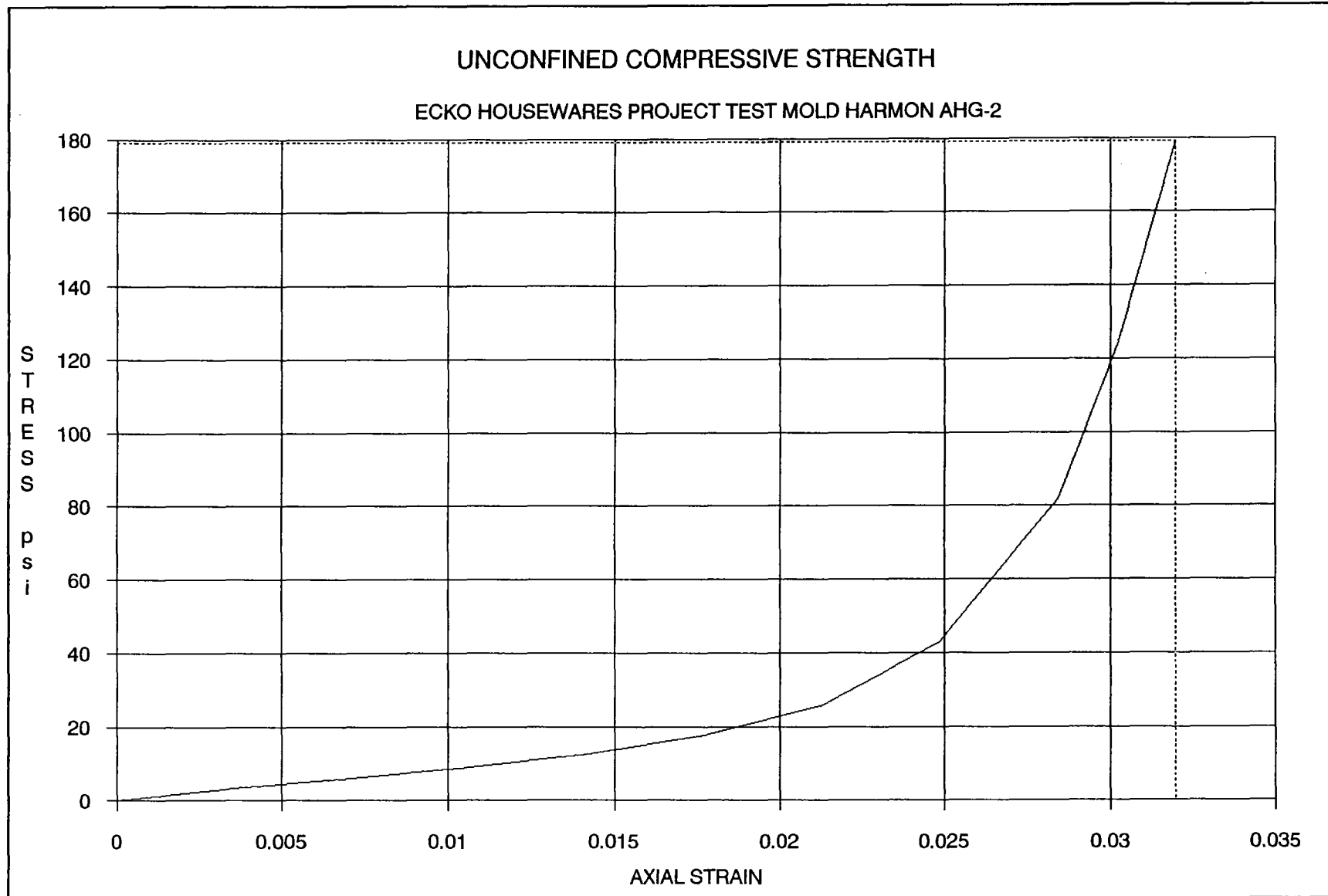
TEST MOLD DATA

Initial Dimensions				Mold Preparation	Mold Description
Diameter inches	Length inches	Area sq inch	Lo/D Ratio		
2.95	5.63	6.83	1.91	none, used cold capping system	grey green firm smooth surface, coarse interior, moist dense, plastic

STRESS/STRAIN DATA

[illegible]

ULTIMATE	180	995	0.180	0.4	0.032	7.06	1224	179.1	
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WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

PROJECT	ECKO HOUSEWARES	TEST MOLD	HARMON AHG-3	DATE	3/23/90
W.O. NO.	2994-02-03-0019	PROVING RING #	PR-15	ANALYST	RWF

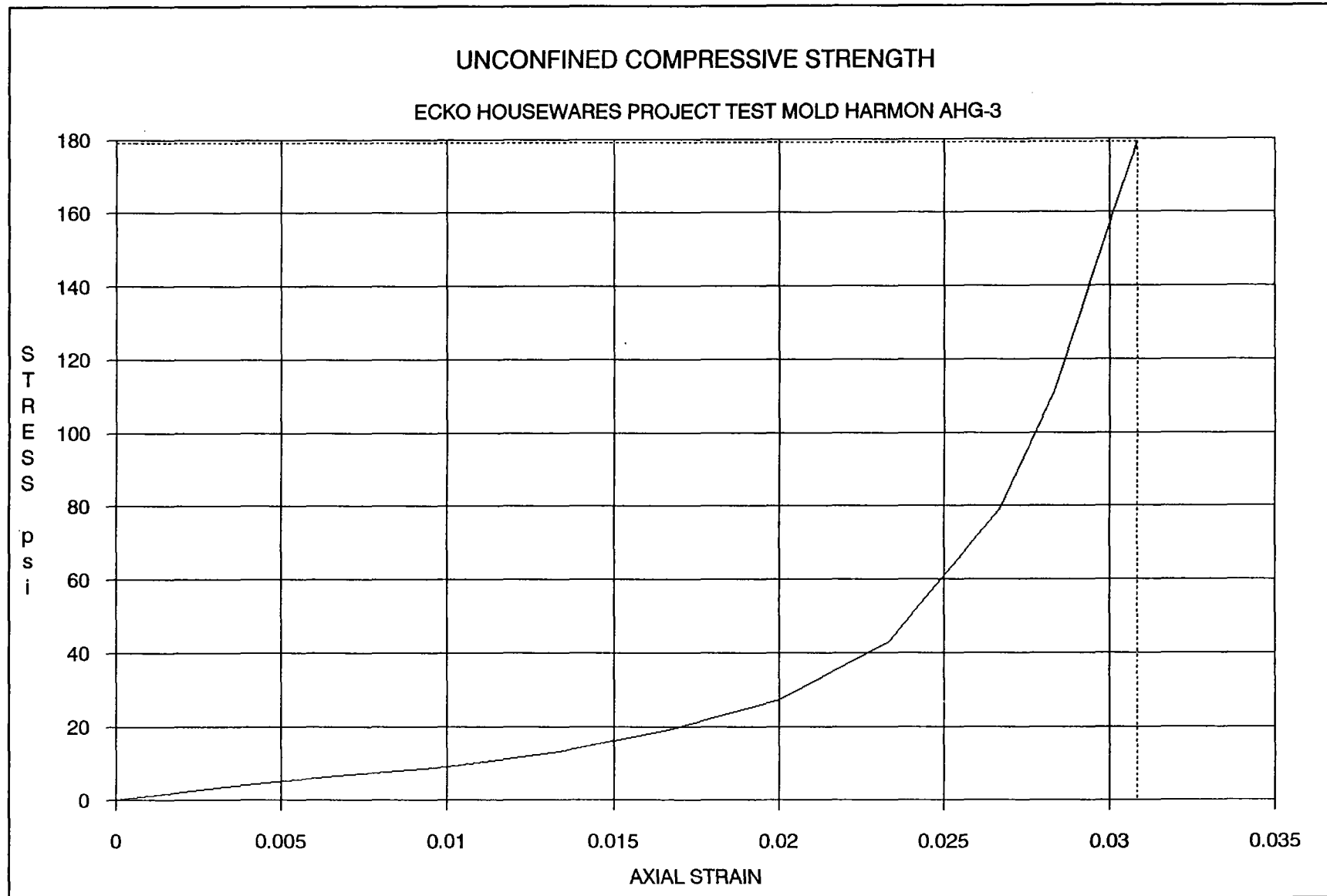
TEST MOLD DATA

Initial Dimensions				Mold Preparation	Mold Description
Diameter inches	Length inches	Area sq inch	Lo/D Ratio		
2.95	6.00	6.83	2.03	none, used cold capping system	grey green firm smooth surface, coarse interior, moist dense, plastic

STRESS/STRAIN DATA

[illegible]

ULTIMATE	185	995	0.185	0.2	0.031	7.05	1224	179.1	
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WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

PROJECT	ECKO HOUSEWARES	TEST MOLD	STC1327-1	DATE	3/30/90
W.O. NO.	2994-02-03-0019	PROVING RING #	PR-15	ANALYST	RWF

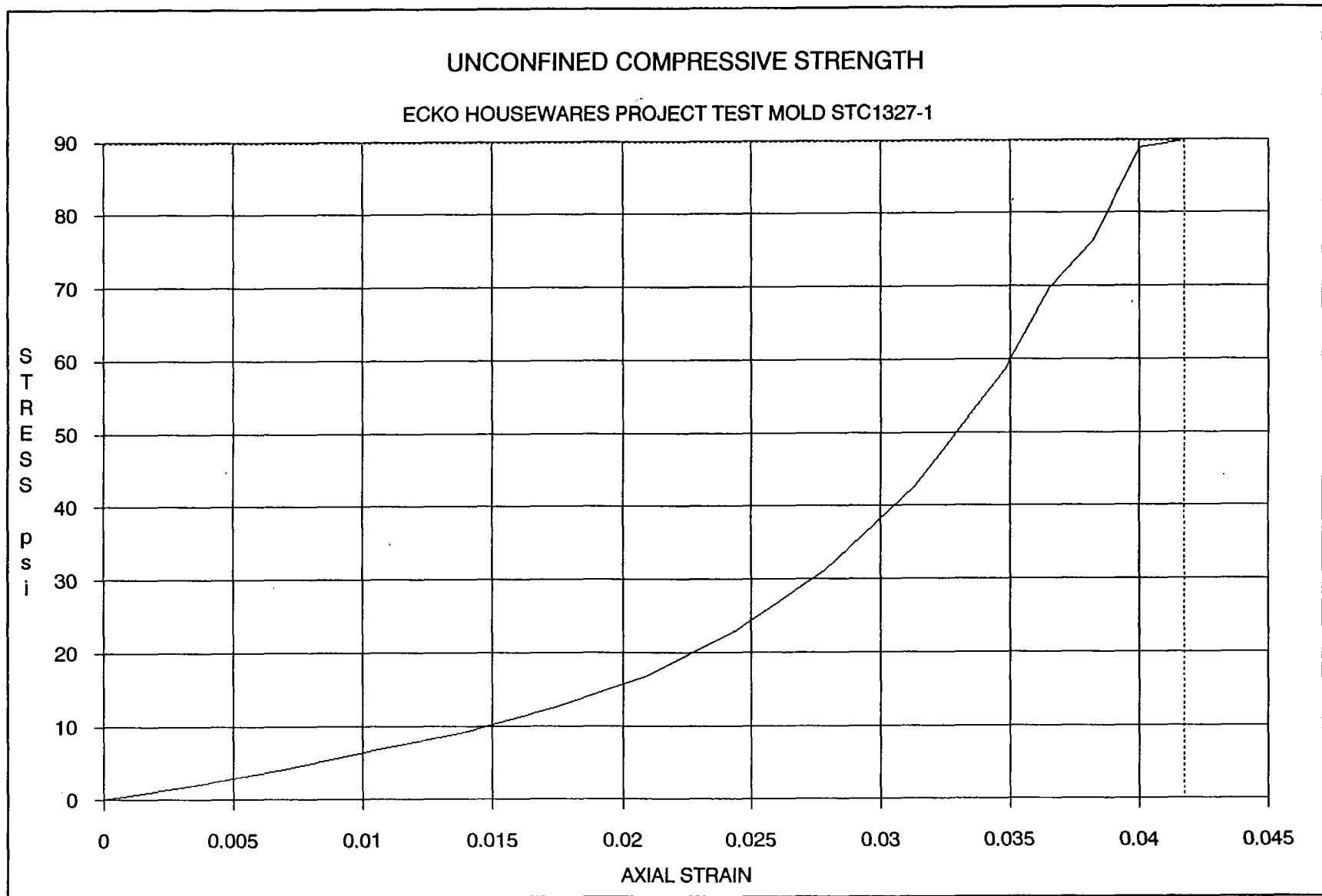
TEST MOLD DATA

Initial Dimensions				Mold Preparation	Mold Description
Diameter inches	Length inches	Area sq inch	Lo/D Ratio		
2.99	5.75	7.02	1.92	none, used cold capping system	dark brown firm smooth surface, coarse interior with some blue crystals and fibers

STRESS/STRAIN DATA

[illegible]

ULTIMATE	240	690	0.240	0.3	0.042	7.33	631	89.9	
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WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

PROJECT	ECKO HOUSEWARES	TEST MOLD	STC1327-2	DATE	3/30/90
W.O. NO.	2994-02-03-0019	PROVING RING #	PR-15	ANALYST	RWF

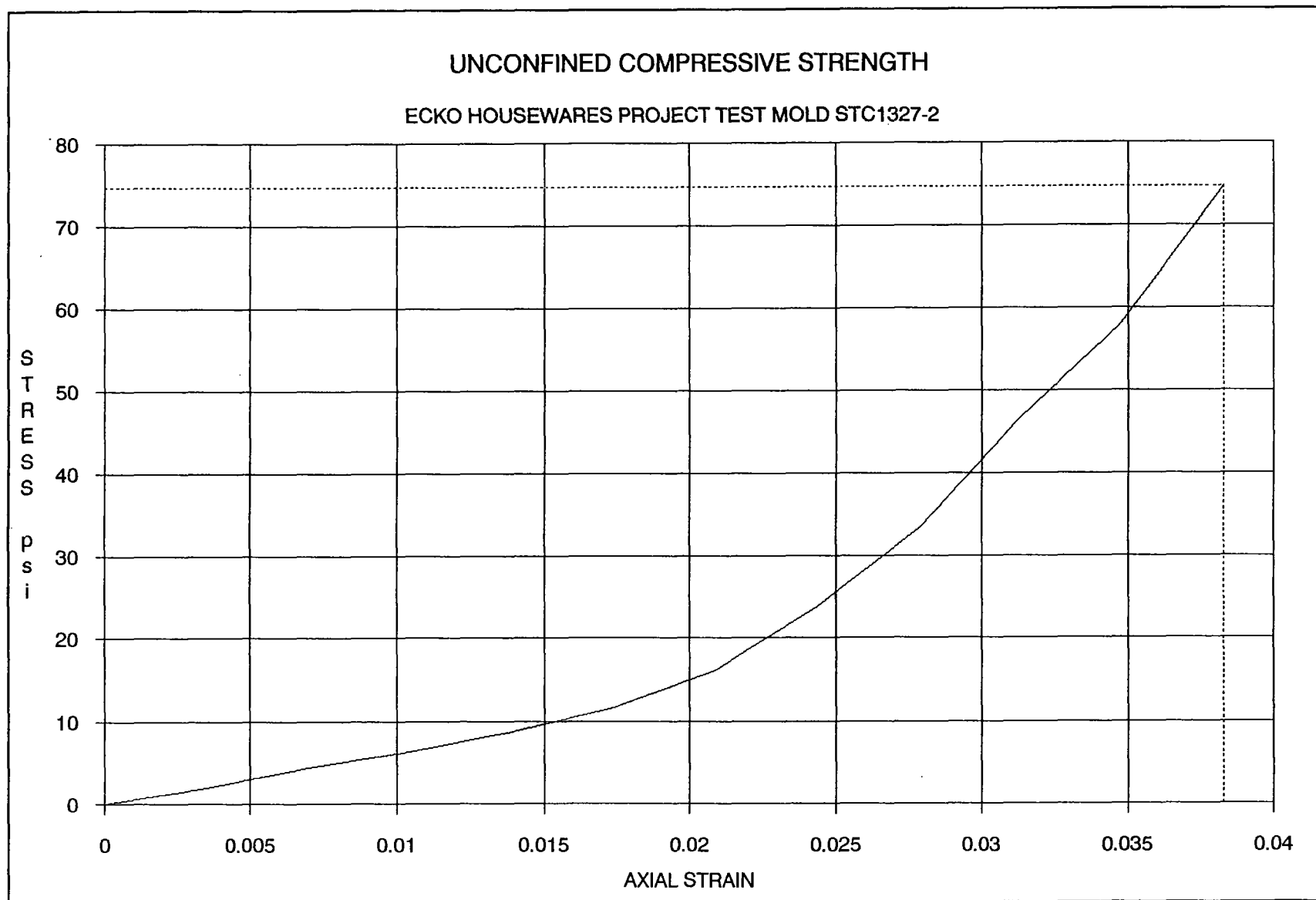
TEST MOLD DATA

Initial Dimensions				Mold Preparation	Mold Description
Diameter inches	Length inches	Area sq inch	Lo/D Ratio		
3.01	5.75	7.12	1.91	none, used cold capping system	dark brown firm smooth surface, coarse interior with some blue crystals and fibers

STRESS/STRAIN DATA

[illegible]

ULTIMATE	220	580	0.220	0.7	0.038	7.40	531	74.6	
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WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

PROJECT	ECKO HOUSEWARES	TEST MOLD	STC1327-3	DATE	3/30/90
W.O. NO.	2994-02-03-0019	PROVING RING #	PR-15	ANALYST	RWF

TEST MOLD DATA

Initial Dimensions				Mold Preparation	Mold Description
Diameter inches	Length inches	Area sq inch	Lo/D Ratio		
3.00	5.83	7.07	1.94	none, used cold capping system	dark brown firm smooth surface, coarse interior with some blue crystals and fibers

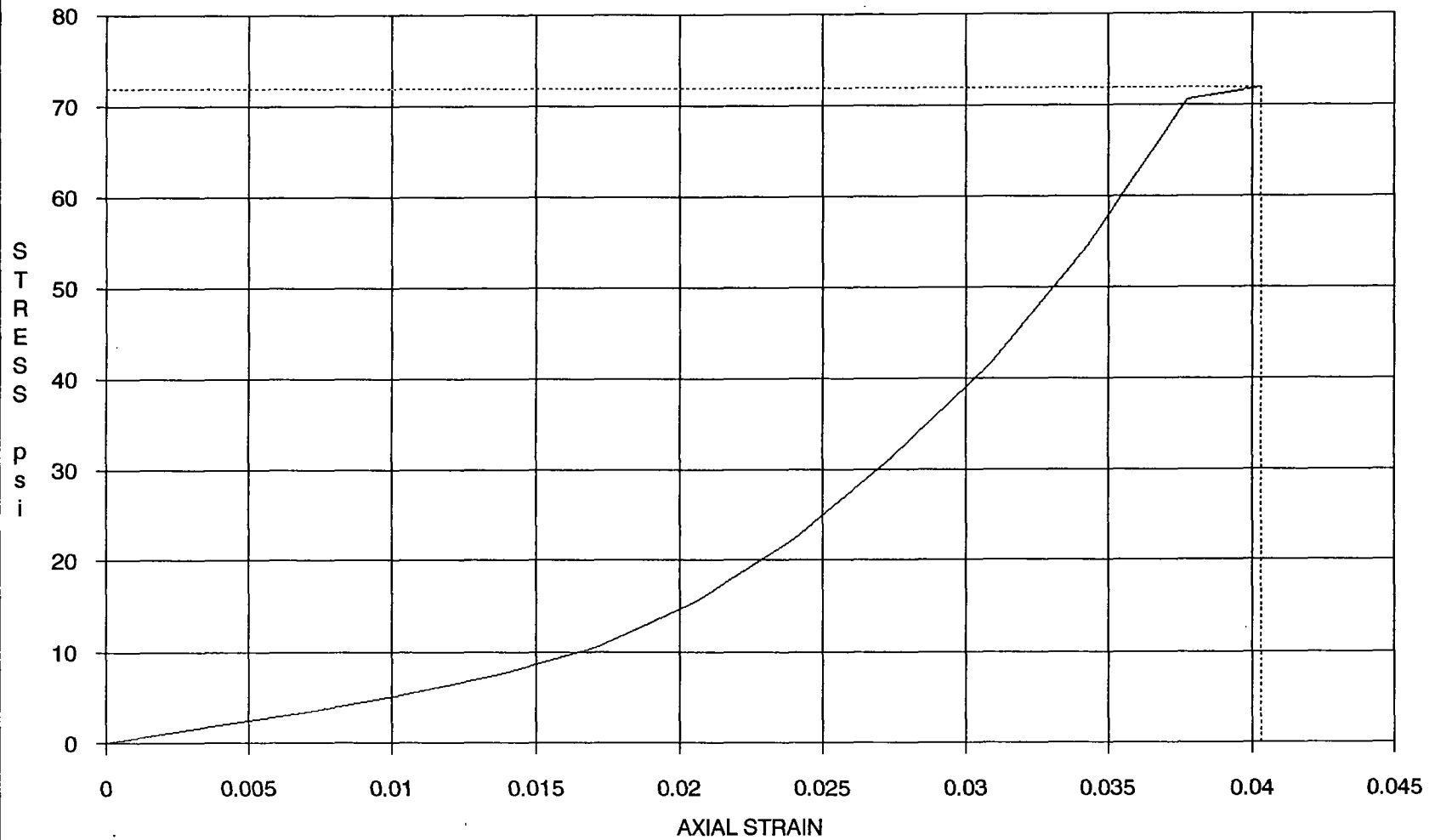
STRESS/STRAIN DATA

[illegible]

ULTIMATE	235	555	0.235	0.5	0.040	7.37	508	71.9	
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UNCONFINED COMPRESSIVE STRENGTH

ECKO HOUSEWARES PROJECT TEST MOLD STC1327-3



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

PROJECT	ECKO HOUSEWARES	TEST MOLD	WESTON1-1	DATE	4/4/90
W.O. NO.	2994-02-03-0019	PROVING RING #	PR-15	ANALYST	RWF

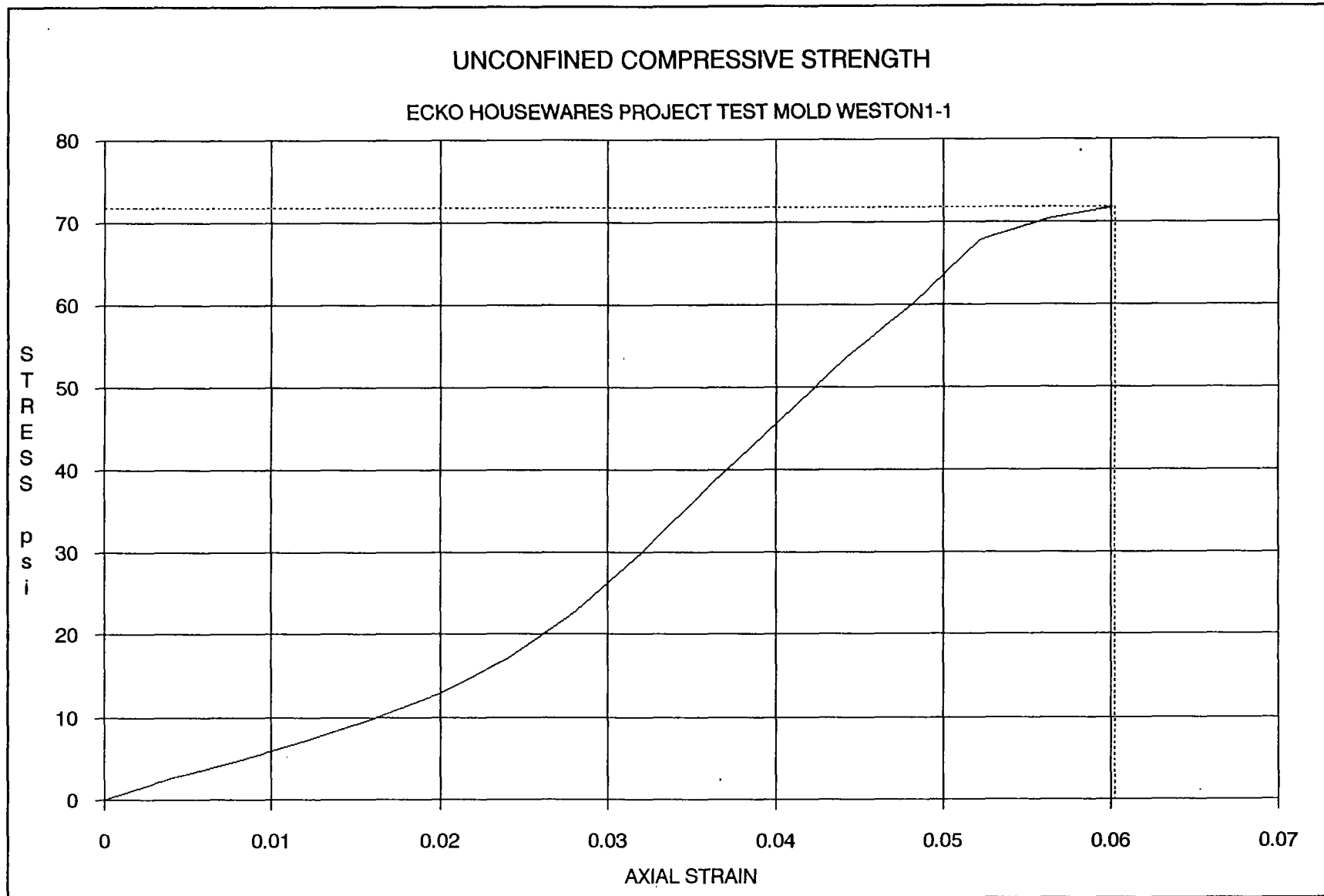
TEST MOLD DATA

Initial Dimensions				Mold Preparation	Mold Description
Diameter inches	Length inches	Area sq inch	Lo/D Ratio		
2.99	4.98	7.02	1.67	none, used cold capping system	dark grey brittle rough surface, coarse interior with blue-green crystals

STRESS/STRAIN DATA

[illegible]

ULTIMATE	300	550	0.300	0.4	0.060	7.47	504	71.7	
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WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

PROJECT	ECKO HOUSEWARES	TEST MOLD	WESTON1-2	DATE	4/4/90
W.O. NO.	2994-02-03-0019	PROVING RING #	PR-15	ANALYST	RWF

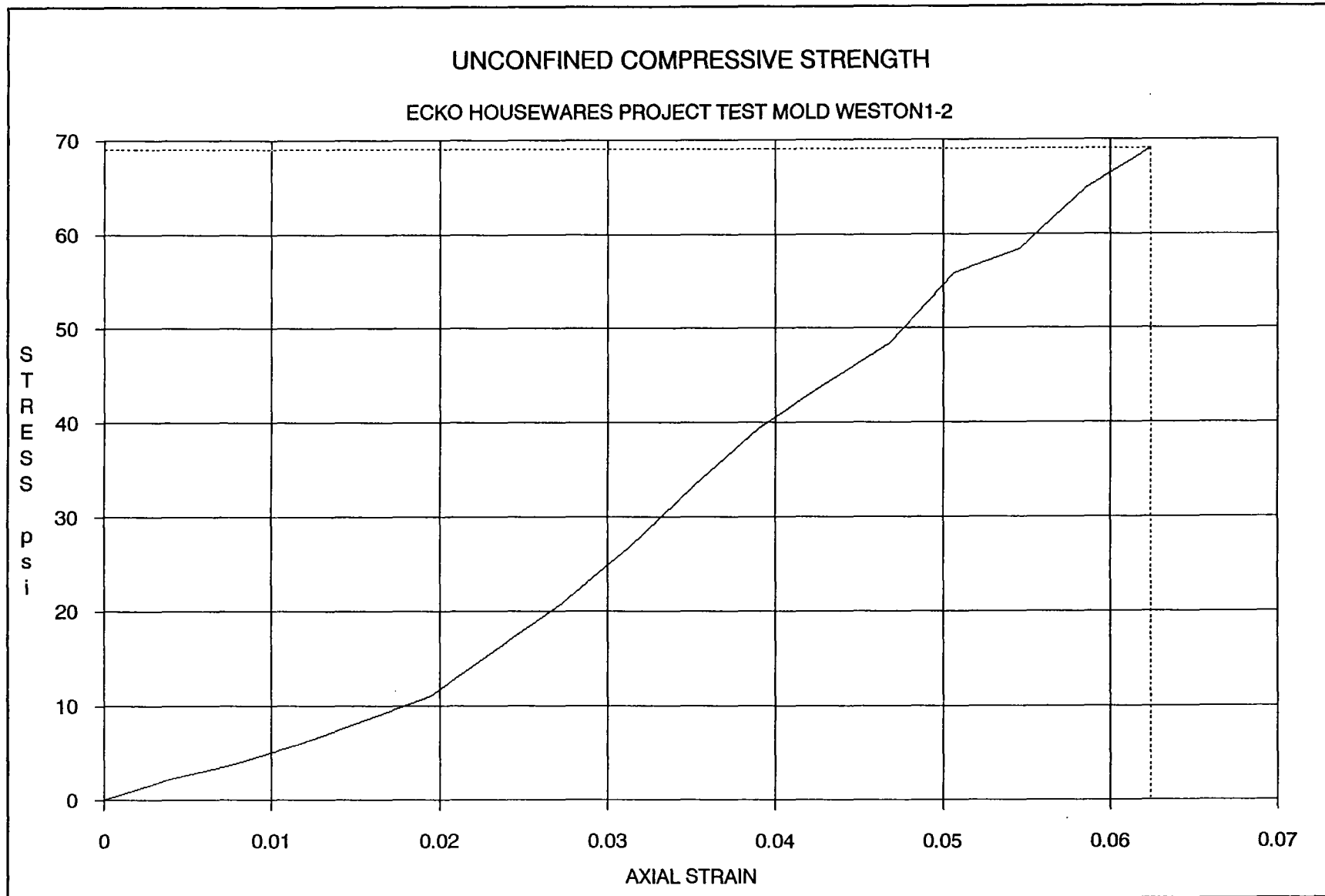
TEST MOLD DATA

Initial Dimensions				Mold Preparation	Mold Description
Diameter inches	Length inches	Area sq inch	Lo/D Ratio		
3.00	5.13	7.07	1.71	none, used cold capping system	dark grey brittle rough surface, coarse interior with blue-green crystals

STRESS/STRAIN DATA

[illegible]

ULTIMATE	320	533	0.320	0.8	0.062	7.54	488	69.1	
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UNCONFINED COMPRESSIVE STRENGTH TEST DATA

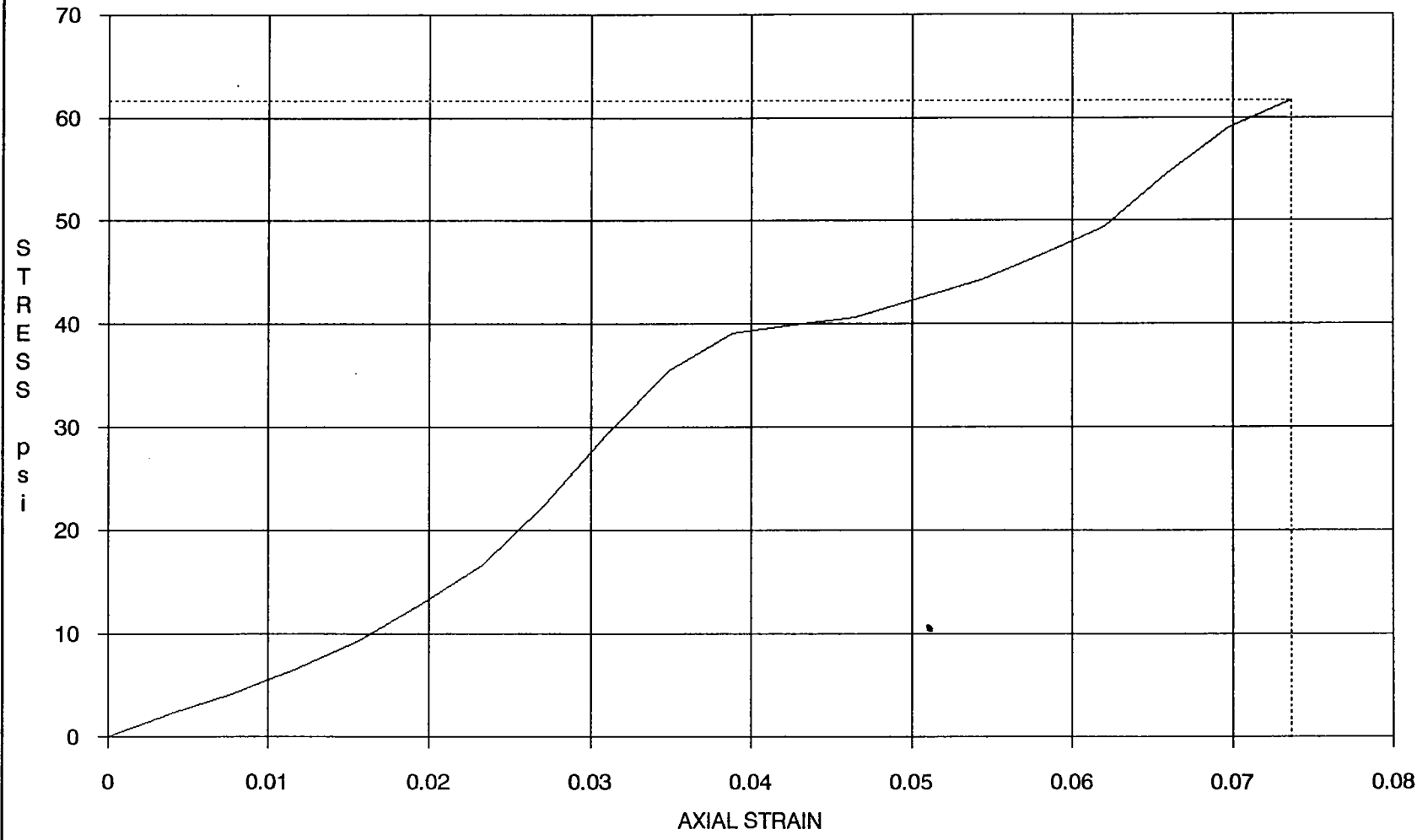
TEST MOLD DATA					
Initial Dimensions				Mold Preparation	Mold Description
Diameter inches	Length inches	Area sq inch	Lo/D Ratio		
3.00	5.16	7.07	1.72	none, used cold capping system	dark grey brittle rough surface, coarse interior with blue-green crystals

[illegible]

ULTIMATE	380	475	0.380	0.8	0.074	7.63	435	61.6	
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UNCONFINED COMPRESSIVE STRENGTH

ECKO HOUSEWARES PROJECT TEST MOLD WESTON1-3



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

PROJECT	ECKO HOUSEWARES	TEST MOLD	WESTON2-1	DATE	4/4/90
W.O. NO.	2994-02-03-0019	PROVING RING #	PR-15	ANALYST	RWF

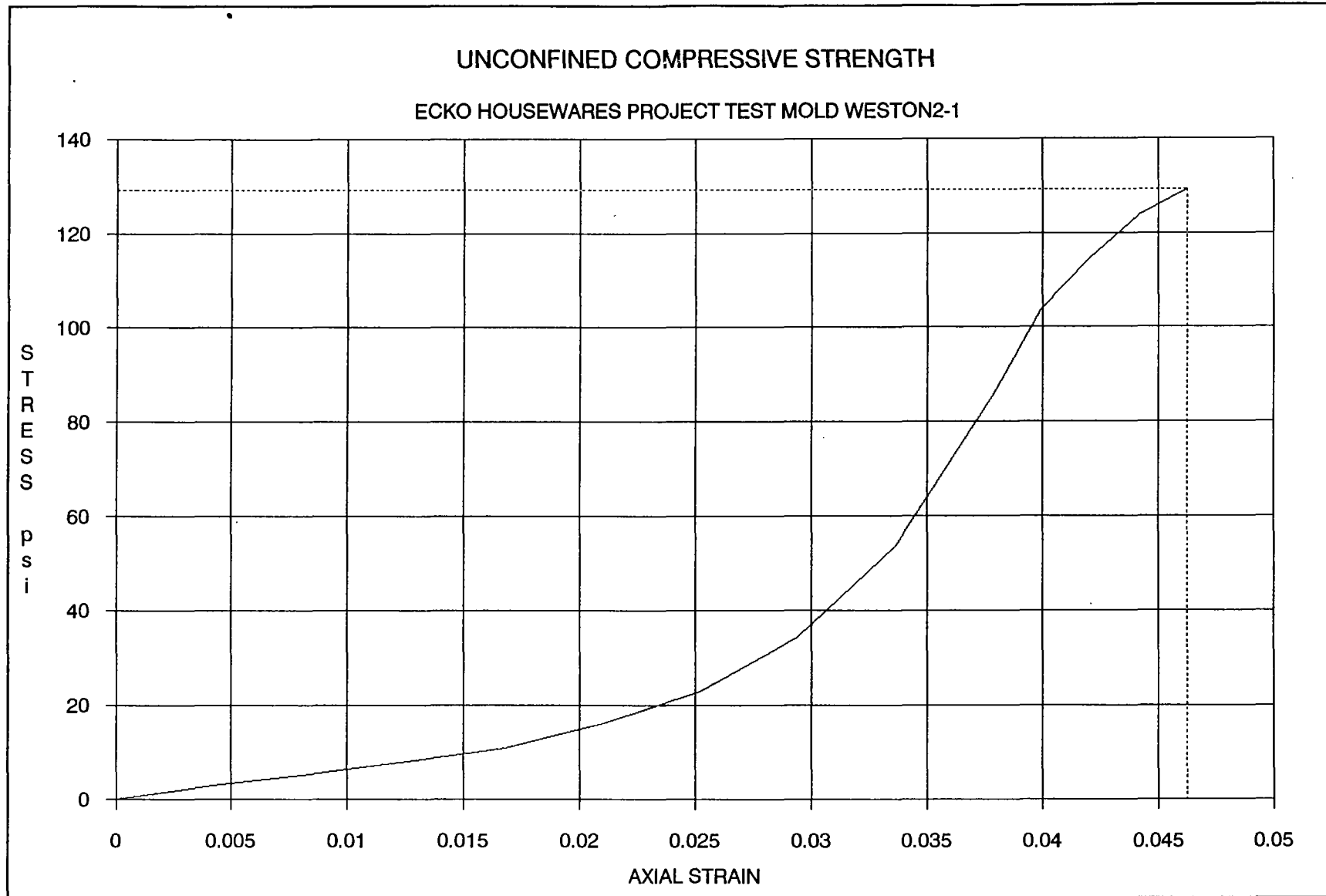
TEST MOLD DATA

Initial Dimensions				Mold Preparation	Mold Description
Diameter inches	Length inches	Area sq inch	Lo/D Ratio		
2.99	4.76	7.02	1.59	none, used cold capping system	dark grey brittle rough surface, coarse interior with blue-green crystals

STRESS/STRAIN DATA

[illegible]

ULTIMATE	220	848	0.220	0.0	0.046	7.36	907	129.2	
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WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

PROJECT	ECKO HOUSEWARES	TEST MOLD	WESTON2-2	DATE	4/4/90
W.O. NO.	2994-02-03-0019	PROVING RING #	PR-15	ANALYST	RWF

TEST MOLD DATA

Initial Dimensions				Mold Preparation	Mold Description
Diameter inches	Length inches	Area sq inch	Lo/D Ratio		
3.00	4.85	7.07	1.62	none, used cold capping system	dark grey brittle rough surface, coarse interior with blue-green crystals

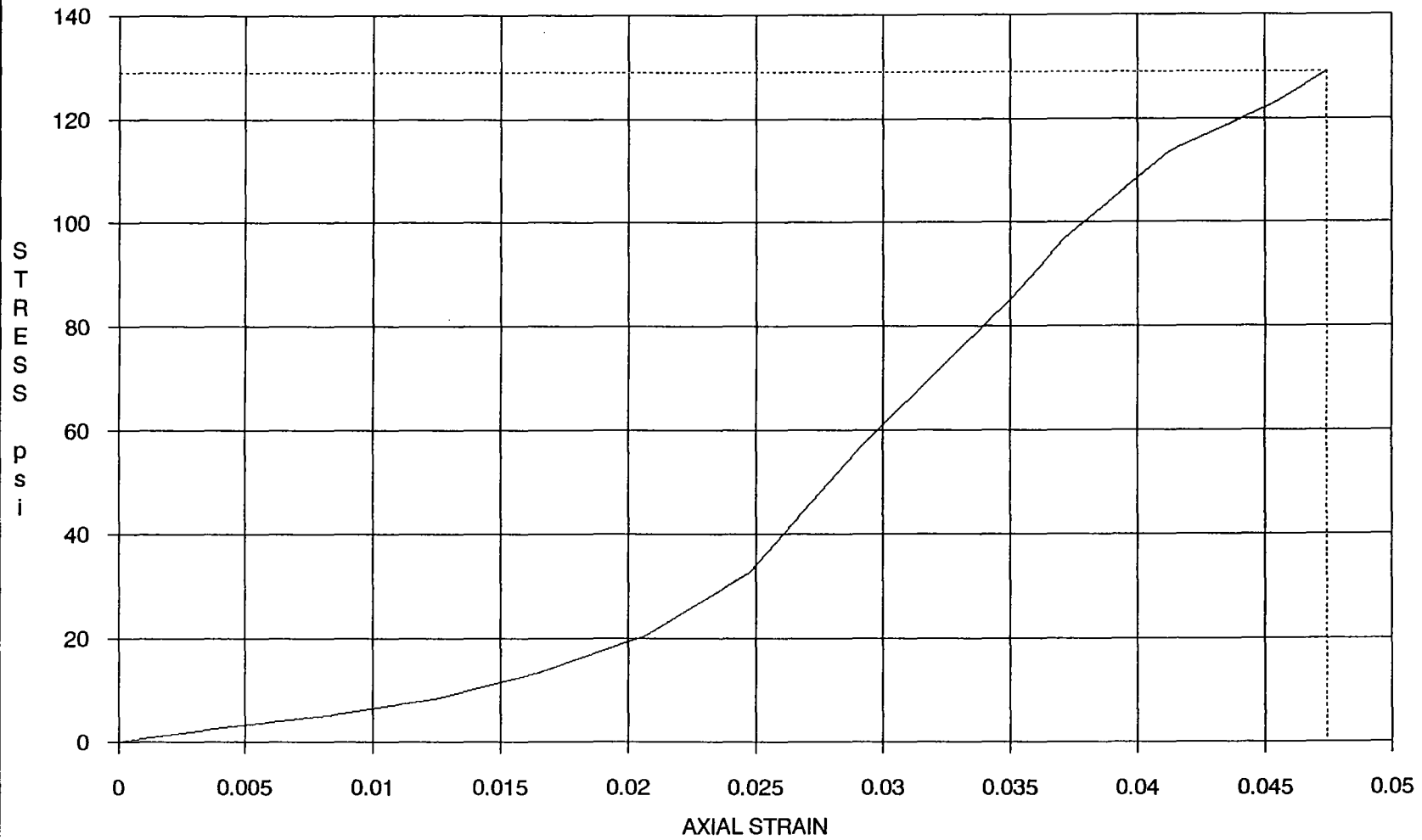
STRESS/STRAIN DATA

[illegible]

ULTIMATE	230	850	0.230	0.4	0.047	7.42	911	128.9	
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UNCONFINED COMPRESSIVE STRENGTH

ECKO HOUSEWARES PROJECT TEST MOLD WESTON2-2



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

PROJECT	ECKO HOUSEWARES	TEST MOLD	WESTON2-3	DATE	4/4/90
W.O. NO.	2994-02-03-0019	PROVING RING #	PR-15	ANALYST	RWF

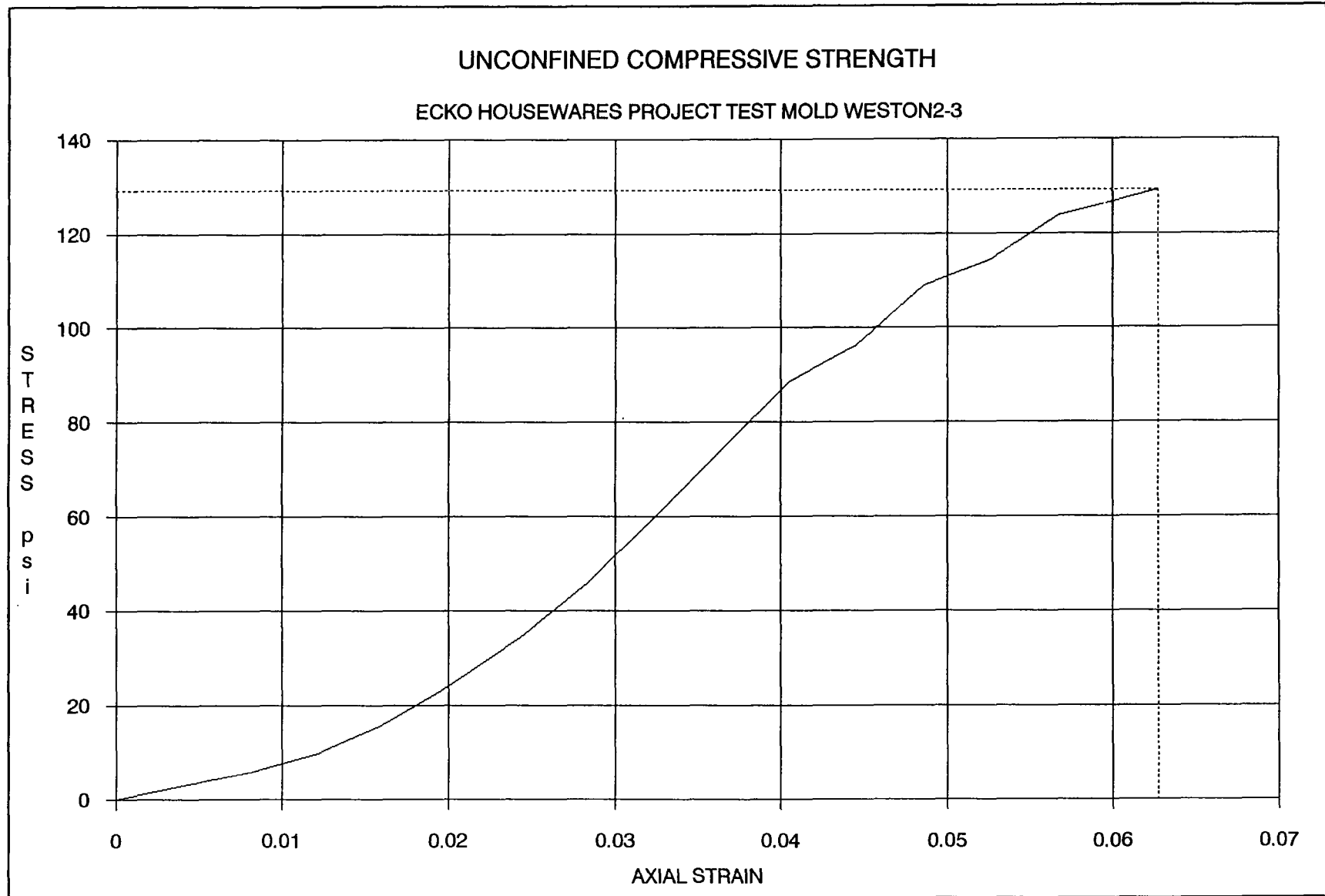
TEST MOLD DATA

Initial Dimensions				Mold Preparation	Mold Description
Diameter inches	Length inches	Area sq inch	Lo/D Ratio		
2.99	4.94	7.02	1.65	none, used cold capping system	dark grey brittle rough surface, coarse interior with blue-green crystals

STRESS/STRAIN DATA

[illegible]

ULTIMATE	310	848	0.310	0.4	0.063	7.49	907	129.2	
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**TREATED SOIL
UNCONFINED COMPRESSIVE STRENGTH
TEST RESULTS**

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

HYDRAULIC CONDUCTIVITY OF FINE GRAINED SOILS - TEST DATA AND RESULTS

PROJECT	ECKO HOUSEWARES	PROJECT SAMPLE I. D.	ENRICO A-4	Date	3/7/90
JOB NUMBER	900201	ETL SAMPLE NUMBER		Analyst	RWF
W. O. NUMBER	2994-02-03-0019	DATE DUE	3/7/90	Balance	XL3K

SOIL DESCRIPTION	UCSC	Maximum Confining
ENRICO A-4 stabilized waste test cylinder, with the end trimmed square	Class	Pressure, psi
	NA	2.00

PERMEAMETER AND SAMPLE CELL DATA										
Permeameter #	Cell Dimensions			Cell	Moisture	Unit Weight, pcf		Specific	Void	Degree
1	Diameter	Length	Volume	Wet Wt.	Content	Wet	Dry	Gravity	Ratio	Satur.
flexi-wall	cm	cm	cc	grams	%					%
Initial	7.60	15.05	682.8	1173.2	39.9	107.2	76.7	2.76	1.25	88.2
Final	7.60	15.05	682.8	1205.6	46.6	110.2	75.2	2.76	1.29	99.5

TEST DATA										
Date Time	Burette Volume, ml			Burette Pressure, psi			Temp. C	Differ. Pressure psi	I/O Flow Ratio	Hydraulic Conduct. cm/sec
	Cell	Inlet	Outlet	Cell	Inlet	Outlet				
3/7/90 09:40	8.0	0.5	24.5	61.0	60.0	59.0	20.0	1.3		
3/7/90 13:20	8.1	19.7	6.7	61.0	60.0	59.0	20.0	0.8	1.079	5.69 E-06
3/7/90 12:23	8.1	0.4	24.6	61.0	60.0	59.0	20.0	1.3		
3/7/90 18:30	8.2	25.0	0.0	61.0	60.0	59.0	20.0	0.6	1.000	5.03 E-06
3/8/90 08:23	0.7	0.5	24.5	61.0	60.0	59.0	20.0	1.3		
3/8/90 10:23	0.7	9.9	15.0	61.0	60.0	59.0	20.0	1.1	0.989	4.68 E-06
3/8/90 13:10	0.8	19.5	5.5	61.0	60.0	59.0	20.0	0.8	1.011	4.39 E-06
3/8/90 14:31	0.9	23.1	1.8	61.0	60.0	59.0	20.0	0.7	0.973	4.31 E-06
3/8/90 14:32	0.9	0.3	24.8	61.0	60.0	59.0	20.0	1.3		
3/8/90 17:14	0.9	12.2	12.8	61.0	60.0	59.0	20.0	1.0	0.992	4.50 E-06
3/8/90 18:11	0.9	15.6	9.5	61.0	60.0	59.0	20.0	0.9	1.030	4.37 E-06
3/9/90 09:22	1.0	0.2	24.8	61.0	60.0	59.0	20.0	1.3		
3/9/90 12:14	1.1	13.1	11.8	61.0	60.0	59.0	20.0	1.0	0.992	4.65 E-06
3/9/90 13:13	1.1	16.5	8.3	61.0	60.0	59.0	20.0	0.9	0.971	4.49 E-06

NOTES

- (1) Initial conditions: stabilized waste specimen created by vendor, cured 28 days
 (2) Final conditions: consolidated at reported maximum confining pressure

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

HYDRAULIC CONDUCTIVITY OF FINE GRAINED SOILS - TEST DATA AND RESULTS

PROJECT	ECKO HOUSEWARES	PROJECT SAMPLE I. D.	ENRICO A-4
JOB NUMBER	900201	ETL SAMPLE NUMBER	000
W. O. NUMBER	2994-02-03-0019	TEST PERIOD	3/7/90 to 3/9/90

SOIL DESCRIPTION	UCSC
ENRICO A-4 stabilized waste test cylinder, with the end trimmed square	Class
	NA

TEST DATA AND RESULTS					
Test Condition	Initial(1)	Final(2)			
Moisture Content, % dry basis	39.9	46.6			
Wet Unit Weight, pcf	107.2	110.2			
Dry Unit Weight, pcf	76.7	75.2			
Specific Gravity	2.76	2.76			
Void Ratio	1.25	1.29			
Porosity, %	55.5	56.4			
Degree of Saturation, %	88.2	99.5			
Maximum Confining Pressure, psi		2.00			
Average Differential Pressure, psi		0.93			
Hydraulic Gradient		4.4			
Hydraulic Permeability, cm/sec		4.49E-06			

NOTES

- (1) Initial conditions: stabilized waste specimen created by vendor, cured 28 days
 (2) Final conditions: consolidated at reported maximum confining pressure

HYDRAULIC CONDUCTIVITY OF FINE GRAINED SOILS - TEST DATA AND RESULTS

SOIL DESCRIPTION	UCSC	Maximum Confining
ENRICO B-4 stabilized waste test cylinder, with the end trimmed square	Class	Pressure, psi
	NA	2.00

Permeameter #	Cell Dimensions			Cell	Moisture					Degree
1 flexi-wall	Diameter cm	Length cm	Volume cc	Wet Wt. grams	Content %	Unit Weight, pcf		Specific Gravity	Void Ratio	Satur. %
						Wet	Dry			
Initial	7.60	15.02	681.5	1172.4	43.9	107.4	74.6	2.76	1.31	92.6
Final	7.60	15.02	681.5	1201.3	46.8	110.0	74.9	2.76	1.30	99.5

[illegible]

(1) Initial conditions: stabilized waste specimen created by vendor, cured 28 days
(2) Final conditions: consolidated at reported maximum confining pressure

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

HYDRAULIC CONDUCTIVITY OF FINE GRAINED SOILS - TEST DATA AND RESULTS

PROJECT	ECKO HOUSEWARES	PROJECT SAMPLE I. D.	ENRICO B-4
JOB NUMBER	900201	ETL SAMPLE NUMBER	000
W. O. NUMBER	2994-02-03-0019	TEST PERIOD	3/10/90 to 3/11/90

SOIL DESCRIPTION	UCSC
ENRICO B-4 stabilized waste test cylinder, with the end trimmed square	Class
	NA

TEST DATA AND RESULTS					
Test Condition	Initial(1)	Final(2)			
Moisture Content, % dry basis	43.9	46.8			
Wet Unit Weight, pcf	107.4	110.0			
Dry Unit Weight, pcf	74.6	74.9			
Specific Gravity	2.76	2.76			
Void Ratio	1.31	1.30			
Porosity, %	56.7	56.5			
Degree of Saturation, %	92.6	99.5			
Maximum Confining Pressure, psi		2.00			
Average Differential Pressure, psi		0.82			
Hydraulic Gradient		3.8			
Hydraulic Permeability, cm/sec		5.73E-06			

NOTES

- (1) Initial conditions: stabilized waste specimen created by vendor, cured 28 days
 (2) Final conditions: consolidated at reported maximum confining pressure

HYDRAULIC CONDUCTIVITY OF FINE GRAINED SOILS - TEST DATA AND RESULTS

SOIL DESCRIPTION	UCSC	Maximum Confining
HARMON AHG-4 stabilized waste test cylinder, with the end trimmed square	Class	Pressure, psi
	NA	2.00

Permeameter #	Cell Dimensions			Cell Wet Wt. grams	Moisture Content %	Unit Weight, pcf		Specific Gravity	Void Ratio	Degree Satur. %
	Diameter cm	Length cm	Volume cc			Wet	Dry			
Initial	7.60	15.20	689.6	1221.8	34.6	110.6	82.1	2.83	1.15	85.1
Final	7.60	15.20	689.6	1275.4	40.4	115.4	82.2	2.83	1.15	99.6

[illegible]

(1) Initial conditions: stabilized waste specimen created by vendor, cured 28 days
(2) Final conditions: consolidated at reported maximum confining pressure

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

HYDRAULIC CONDUCTIVITY OF FINE GRAINED SOILS - TEST DATA AND RESULTS

PROJECT	ECKO HOUSEWARES	PROJECT SAMPLE I. D.	HARMON AHG-4
JOB NUMBER	900201	ETL SAMPLE NUMBER	000
W. O. NUMBER	2994-02-03-0019	TEST PERIOD	3/23/90 to 3/26/90

SOIL DESCRIPTION	UCSC
HARMON AHG-4 stabilized waste test cylinder, with the end trimmed square	Class
	NA

TEST DATA AND RESULTS					
Test Condition	Initial(1)	Final(2)			
Moisture Content, % dry basis	34.6	40.4			
Wet Unit Weight, pcf	110.6	115.4			
Dry Unit Weight, pcf	82.1	82.2			
Specific Gravity	2.83	2.83			
Void Ratio	1.15	1.15			
Porosity, %	53.5	53.5			
Degree of Saturation, %	85.1	99.6			
Maximum Confining Pressure, psi		2.00			
Average Differential Pressure, psi		1.18			
Hydraulic Gradient		5.5			
Hydraulic Permeability, cm/sec		7.07E-07			

NOTES

- (1) Initial conditions: stabilized waste specimen created by vendor, cured 28 days
 (2) Final conditions: consolidated at reported maximum confining pressure

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

HYDRAULIC CONDUCTIVITY OF FINE GRAINED SOILS - TEST DATA AND RESULTS

PROJECT	ECKO HOUSEWARES	PROJECT SAMPLE I. D.	STC1327-4	Date	3/30/90
JOB NUMBER	900201	ETL SAMPLE NUMBER		Analyst	RWF
W. O. NUMBER	2994-02-03-0019	DATE DUE	3/30/90	Balance	XL3K

SOIL DESCRIPTION	UCSC	Maximum Confining
STC1327-4 stabilized waste test cylinder, with the end trimmed square	Class	Pressure, psi
	NA	2.00

PERMEAMETER AND SAMPLE CELL DATA

Permeameter #	Cell Demensions			Cell	Moisture					Degree
1	Diameter	Length	Volume	Wet Wt.	Content	Unit Weight, pcf		Specific	Void	Satur.
flexi-wall	cm	cm	cc	grams	%	Wet	Dry	Gravity	Ratio	%
Initial	7.62	14.84	676.8	995.1	44.5	91.7	63.5	2.81	1.76	71.0
Final	7.62	14.84	676.8	1118.5	62.5	103.1	63.5	2.81	1.76	99.6

TEST DATA

[illegible]

NOTES

- (1) Initial conditions: stabilized waste specimen created by vendor, cured 28 days
(2) Final conditions: consolidated at reported maximum confining pressure

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

HYDRAULIC CONDUCTIVITY OF FINE GRAINED SOILS - TEST DATA AND RESULTS

PROJECT	ECKO HOUSEWARES	PROJECT SAMPLE I. D.	STC1327-4
JOB NUMBER	900201	ETL SAMPLE NUMBER	
W. O. NUMBER	2994-02-03-0019	TEST PERIOD	3/30/90 to 4/1/90

SOIL DESCRIPTION	UCSC
STC1327-4 stabilized waste test cylinder, with the end trimmed square	Class
	NA

TEST DATA AND RESULTS					
Test Condition	Initial(1)	Final(2)			
Moisture Content, % dry basis	44.5	62.5			
Wet Unit Weight, pcf	91.7	103.1			
Dry Unit Weight, pcf	63.5	63.5			
Specific Gravity	2.81	2.81			
Void Ratio	1.76	1.76			
Porosity, %	63.8	63.8			
Degree of Saturation, %	71.0	99.6			
Maximum Confining Pressure, psi		2.00			
Average Differential Pressure, psi		1.14			
Hydraulic Gradient		5.4			
Hydraulic Permeability, cm/sec		1.03E-05			

NOTES

- (1) Initial conditions: stabilized waste specimen created by vendor, cured 28 days
 (2) Final conditions: consolidated at reported maximum confining pressure

HYDRAULIC CONDUCTIVITY OF FINE GRAINED SOILS - TEST DATA AND RESULTS

SOIL DESCRIPTION	UCSC	Maximum Confining
WESTON 1-6 stabilized waste test cylinder, with the end trimmed square	Class	Pressure, psi
	NA	2.00

Permeameter #	Cell Dimensions			Cell Wet Wt. grams	Moisture Content %	Unit Weight, pcf		Specific Gravity	Void Ratio	Degree Satur. %
	Diameter cm	Length cm	Volume cc			Wet	Dry			
Initial	7.62	12.00	547.3	921.4	32.1	105.0	79.5	2.80	1.20	75.1
Final	7.62	12.00	547.3	994.6	42.5	113.4	79.6	2.80	1.20	99.5

[illegible]

(1) Initial conditions: stabilized waste specimen created by vendor, cured 28 days
(2) Final conditions: consolidated at reported maximum confining pressure

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

HYDRAULIC CONDUCTIVITY OF FINE GRAINED SOILS - TEST DATA AND RESULTS

PROJECT	ECKO HOUSEWARES	PROJECT SAMPLE I. D.	WESTON 1-6
JOB NUMBER	900201	ETL SAMPLE NUMBER	
W. O. NUMBER	2994-02-03-0019	TEST PERIOD	4/4/90 to 4/5/90

SOIL DESCRIPTION	UCSC
WESTON 1-6 stabilized waste test cylinder, with the end trimmed square	Class
	NA

TEST DATA AND RESULTS					
Test Condition	Initial(1)	Final(2)			
Moisture Content, % dry basis	32.1	42.5			
Wet Unit Weight, pcf	105.0	113.4			
Dry Unit Weight, pcf	79.5	79.6			
Specific Gravity	2.80	2.80			
Void Ratio	1.20	1.20			
Porosity, %	54.5	54.5			
Degree of Saturation, %	75.1	99.5			
Maximum Confining Pressure, psi		2.00			
Average Differential Pressure, psi		1.00			
Hydraulic Gradient		5.9			
Hydraulic Permeability, cm/sec		4.51E-05			

NOTES

- (1) Initial conditions: stabilized waste specimen created by vendor, cured 28 days
 (2) Final conditions: consolidated at reported maximum confining pressure

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

HYDRAULIC CONDUCTIVITY OF FINE GRAINED SOILS - TEST DATA AND RESULTS

PROJECT	ECKO HOUSEWARES	PROJECT SAMPLE I. D.	WESTON 2-6	Date	4/6/90
JOB NUMBER	900201	ETL SAMPLE NUMBER		Analyst	RWF
W. O. NUMBER	2994-02-03-0019	DATE DUE	4/6/90	Balance	XL3K

SOIL DESCRIPTION	UCSC	Maximum Confining
WESTON 2-6 stabilized waste test cylinder, with the end trimmed square	Class	Pressure, psi
	NA	2.00

PERMEAMETER AND SAMPLE CELL DATA

Permeameter #	Cell Demensions			Cell	Moisture	Unit Weight, pcf		Specific	Void	Degree
1	Diameter	Length	Volume	Wet Wt.	Content	Wet	Dry	Gravity	Ratio	Satur.
flexi-wall	cm	cm	cc	grams	%					%
Initial	7.63	12.20	557.9	912.3	30.4	102.0	78.3	2.85	1.27	68.0
Final	7.63	12.20	557.9	1010.8	44.3	113.1	78.3	2.85	1.27	99.4

TEST DATA

Date Time	Burette Volume, ml			Burette Pressure, psi			Temp. C	Differ. Pressure psi	I/O Flow Ratio	Hydraulic Conduct. cm/sec
	Cell	Inlet	Outlet	Cell	Inlet	Outlet				
4/6/90 13:30	1.5	2.8	21.4	61.0	60.0	59.0	22.0	1.3		
4/6/90 14:00	2.0	11.0	12.9	61.0	60.0	59.0	22.0	1.0	0.965	1.34 E-05
4/6/90 15:12	3.0	24.4	-1.2	61.0	60.0	59.0	22.0	0.6	0.950	1.28 E-05
4/6/90 15:20	3.1	0.4	24.6	61.0	60.0	59.0	22.0	1.3		
4/6/90 16:28	4.0	16.9	7.3	61.0	60.0	59.0	22.0	0.9	0.954	1.25 E-05
4/6/90 16:58	4.3	22.0	1.9	61.0	60.0	59.0	22.0	0.7	0.944	1.22 E-05
4/7/90 08:43	6.6	0.3	24.2	61.0	60.0	59.0	22.0	1.3		
4/7/90 10:10	7.6	21.9	2.2	61.0	60.0	59.0	22.0	0.7	0.982	1.38 E-05
4/7/90 10:11	7.7	0.6	24.7	61.0	60.0	59.0	22.0	1.3		
4/7/90 11:36	7.7	21.8	3.1	61.0	60.0	59.0	22.0	0.7	0.981	1.37 E-05
4/7/90 11:37	7.8	0.5	24.9	61.0	60.0	59.0	22.0	1.3		
4/7/90 13:06	7.8	22.2	3.0	61.0	60.0	59.0	22.0	0.7	0.991	1.33 E-05
4/7/90 13:07	7.9	0.3	24.9	61.0	60.0	59.0	22.0	1.3		
4/7/90 14:44	8.2	23.3	1.7	61.0	60.0	59.0	22.0	0.7	0.991	1.32 E-05

NOTES

- (1) Initial conditions: stabilized waste specimen created by vendor, cured 28 days
 (2) Final conditions: consolidated at reported maximum confining pressure

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

HYDRAULIC CONDUCTIVITY OF FINE GRAINED SOILS - TEST DATA AND RESULTS

PROJECT	ECKO HOUSEWARES	PROJECT SAMPLE I. D.	WESTON 2-6
JOB NUMBER	900201	ETL SAMPLE NUMBER	
W. O. NUMBER	2994-02-03-0019	TEST PERIOD	4/6/90 to 4/7/90

SOIL DESCRIPTION	UCSC
WESTON 2-6 stabilized waste test cylinder, with the end trimmed square	Class
	NA

TEST DATA AND RESULTS					
Test Condition	Initial(1)	Final(2)			
Moisture Content, % dry basis	30.4	44.3			
Wet Unit Weight, pcf	102.0	113.1			
Dry Unit Weight, pcf	78.3	78.3			
Specific Gravity	2.85	2.85			
Void Ratio	1.27	1.27			
Porosity, %	56.0	55.9			
Degree of Saturation, %	68.0	99.4			
Maximum Confining Pressure, psi		2.00			
Average Differential Pressure, psi		1.02			
Hydraulic Gradient		5.9			
Hydraulic Permeability, cm/sec		1.32E-05			

NOTES

- (1) Initial conditions: stabilized waste specimen created by vendor, cured 28 days
 (2) Final conditions: consolidated at reported maximum confining pressure

WESTON

APPENDIX C

LABORATORY ANALYTICAL REPORT



WESTON-GULF COAST LABORATORIES, INC.

2417 Bond St., University Park, Illinois 60466

Phones: (312) 534-5200 (219) 885-7077 (315) 723-7533

April 11, 1990

Mr. Russell Frye
Ecko Housewares
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Dear Mr. Frye:

Please find enclosed the analytical reports for the samples submitted to Weston/Gulf Coast Laboratories for analyses. They were identified as follows:

CLIENT ID	LAB ID#	SAMPLE DATE	DATE RECEIVED
Sample #1	9002G993-001	02/26/90	02/27/90
Sample #2	9002G993-002	02/26/90	02/27/90
Sample #3	9002G993-003	02/26/90	02/27/90
Sample #4	9002G993-004	02/26/90	02/27/90
Sample #5	9002G993-005	02/26/90	02/27/90
Sample #6	9002G993-006	02/26/90	02/27/90
Sample #7	9002G993-007	02/26/90	02/27/90
Sample #8	9002G993-008	02/26/90	02/27/90
Sample #9	9002G993-009	02/26/90	02/27/90

If you have any questions, please contact Sheryl Johnson at our laboratories.

Sincerely,

WESTON/GULF COAST LABORATORIES

John Boudreau
John Boudreau
Laboratory Manager

Michael J. Healy
Michael J. Healy
Project Manager

Jeff A. Kaczinski
Jeff A. Kaczinski
GC/MS Unit Leader

Linda S. Mackley
Linda S. Mackley
Organics Unit Leader

Mani S. Iyer
Mani S. Iyer
Metals Unit Leader

Diane L. Harper
Diane L. Harper
Wet Chemistry Unit Leader

kac


Enclosures

WESTON Analytics Use Only

Custody Transfer Record/Lab Work Request



Client _____
 Work Order _____
 Date Rec'd. _____ Date Due _____
 RFW Contact _____
 Client Contact/Phone _____

Refrigerator#								
#/Type Container								
Volume								
Preservative								
ANALYSES REQUESTED 								

[illegible]

Matrix:	W - Water	DS - Drum Solids	X - Other
S - Soil	O - Oil	DL - Drum Liquids	
SE - Sediment	A - Air	F - Fish	
SO - Solid	WI - Wipe	L - EP/TCLP Leachate	

Special Instructions:

[illegible]

WESTON Analytics
Use Only

Samples Were:
1 Shipped or Hand-Delivered
NOTES:

2 Ambient or Chilled
NOTES:

3 Received Broken/ Leaking (Improperly Sealed)	Y	N
--	---	---

NOTES:

4 Properly Preserved
Y N

NOTES:

5 Received Within
Holding Times
Y N

NOTES:

COC Tape Was:

1 Present on Outer Package	Y	N
----------------------------	---	---

2 Unbroken on Outer Package	Y	N
-----------------------------	---	---

3 Present on Sample
Y N

4 Unbroken on Sample
NOTES: Y N

COC Record Was:

1 Present Upon Receipt
of Samples Y N

Discrepancies Between
Sample Labels and COC
Record? Y N

NOTES:



WESTON-GULF COAST LABORATORIES, INC.

2417 Bond St., University Park, Illinois 60466

Phones: (312) 534-5200 (219) 885-7077 (815) 723-7533

CASE NARRATIVE

METALS

WESTON/Gulf Coast
Ecko Housewares
RFW Batch #: 9002G993

The samples were analyzed as follows:

ICP - Ag, Ba, Cd, Pb
GFAA - As, Se
Cold Vapor - Hg

Preparation Blank (PB)

All PB blanks were below the instrument reporting limits.

Laboratory Control Sample (LCS)

All LCS results met the required QC limits.

Duplicate

All the duplicate results were within the reporting limits.

Spike

All spike results were within the required QC limits except:

9002G993-002 Pb

The spike recovery was 72.1%.

There was not enough sample for a duplicate spike.

Mani S. Iyer
Mani S. Iyer
Metals Unit Leader

4/10/90
Date



WESTON-GULF COAST LABORATORIES, INC.

2417 Bond St., University Park, Illinois 60466

Phones: (312) 534-5200 (219) 885-7077 (815) 723-7533

CASE NARRATIVE
VOA, BNA GC/MS

WESTON/Gulf Coast
Ecko Housware
RFW# 9002G993

VOA DATA:

1. All initial TCLP extractions and VOA analyses were performed within the recommended hold times.
2. All Method Blank target compounds were below Contract Required Quantitation Limits (CRQL). (** or five times the CRQL for the following compounds: methylene chloride, acetone, toluene, 2-butanone). Each compound detected in the TCLP Method Blank is flagged with a "T".
3. All LCS (Method Blank Spike) recoveries were within recommended limits except for one low dichloroethene result.
4. Matrix spike analyses were conducted on another sample that was analyzed with this set.
5. All surrogate recoveries in the volatile analyses were within USEPA QC limits except for one low recovery in the Method Blank spike.
6. Weston-Gulf Coast uses the following GC/MS systems which can be identified on all raw data by either the Instrument ID or the quantitation file ID:

ID #	Instrument	Quant ID File
GCL#1	Hewlett Packard 5970 MSD	ID_MS1
GCL#2	Hewlett Packard 5996	ID_MS2
GCL#3	Hewlett Packard 5996	ID_MS3
GCL#4	Hewlett Packard 5970 MSD	ID_MS4

All analyses were performed using Method SW846-8240 unless otherwise noted. The Internal Standard and Surrogate peaks are labeled by name.

7. All of the samples were analyzed as either low level soils or waters and therefore normal detection limits apply. Each of the water samples were obtained by performing a TCLP extraction on the soils.

John Fajinski / GC/MS Unit Leader
Name/Title

3-14-90
Date

DATA QUALIFIERS

- u - Indicates an inorganic compound was analyzed for but not detected.
- U - Indicates an organic compound was analyzed for but not detected.
- J - Indicates an estimated value for either a TIC or an analyte that meets the identification criteria but the result is less than the specified detection limit.
- B - Indicates the compound was found in the blank and the sample.
- T - Indicates the compound was found in the TCLP extraction blank and the sample.
- E - Concentrations exceed calibration range of the instrument.
- I - Indicates Interference.
- BS - Indicates matrix analyses were conducted on reagent grade water.
- BSD - Blank Spike Duplicate
- BDL - Below Detection Limit
- MS - Matrix Spike
- MSD - Matrix Spike Duplicate
- D - Indicates that surrogate/matrix spike recoveries were not obtained because the extract had to be diluted for analysis.
- DL - Indicates a secondary dilution
- NA - Not Applicable
- DF - Dilution factor

NOTES:

Solid, sediment and sludge results are reported on a dry weight basis except when analyzed for Landfill disposal parameters (such as incineration or Illinois Green Sheet parameters). All other mg/kg results are reported on an "as received" basis.

Reporting limits are detection limits adjusted for sample size used, dilutions made, and in the case of dry weight results, the moisture content of the sample.



WESTON-GULF COAST LABORATORIES, INC.
2417 Bond St., University Park, Illinois 60466
Phones: (708) 534-5200 (219) 885-7077 (815) 723-7533

ANALYTICAL REPORT

To: Ecko Housewares
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Wednesday April 11th, 1990

Attn: Mr. Russell Frye

RE: EKLAGE-C1
Project # 2994-02-03-0019
Lab ID: 9002G993-001
Sample Date: 02/26/90
Date Received: 02/27/90
Units: UG/KG

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
1,2-Dichloropropane	BDL	8	U
cis-1,3-Dichloropropene	BDL	8	U
Trichloroethene	7	8	J
Dibromochloromethane	BDL	8	U
1,1,2-Trichloroethane	BDL	8	U
Benzene	BDL	8	U
Trans-1,3-Dichloropropene	BDL	8	U
Bromoform	BDL	8	U
4-Methyl-2-pentanone	BDL	15	U
2-Hexanone	BDL	15	U
Tetrachloroethene	170	8	
1,1,2,2-Tetrachloroethane	BDL	8	U
Toluene	2	8	J
Chlorobenzene	BDL	8	U
Ethylbenzene	BDL	8	U
Styrene	BDL	8	U
Xylene (total)	BDL	8	U



WESTON-GULF COAST LABORATORIES, INC.
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ANALYTICAL REPORT

To: Ecko Housewares
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Wednesday April 11th, 1990

Attn: Mr. Russell Frye

RE: EKLAGE-C1
Project # 2994-02-03-0019
Lab ID: 9002G993-001
Sample Date: 02/26/90
Date Received: 02/27/90
Units: UG/KG

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
Chloromethane	BDL	15	U
Bromomethane	BDL	15	U
Vinyl Chloride	BDL	15	U
Chloroethane	BDL	15	U
Methylene Chloride	320	8	
Acetone	23	15	
Carbon Disulfide	BDL	8	U
1,1-Dichloroethene	BDL	8	U
1,1-Dichloroethane	BDL	8	U
1,2-Dichloroethene (total)	3	8	J
Chloroform	BDL	8	U
1,2-Dichloroethane	BDL	8	U
2-Butanone	BDL	15	U
1,1,1-Trichloroethane	16	8	
Carbon Tetrachloride	BDL	8	U
Vinyl Acetate	BDL	15	U
Bromodichloromethane	BDL	8	U



WESTON-GULF COAST LABORATORIES, INC.
2417 Bond St., University Park, Illinois 60466
Phones: (708) 534-5200 (219) 885-7077 (815) 723-7533

ANALYTICAL REPORT

To: Ecko Housewares
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Wednesday April 11th, 1990

RE: EKLAGE-C1
Project # 2994-02-03-0019
Lab ID: 90026993-001
Sample Date: 02/26/90
Date Received: 02/27/90

Attn: Mr. Russell Frye

Inorganic Client Data Report

Parameters	Result	Units	Reporting Limit
% Solids	66.3	%	0.10



WESTON-GULF COAST LABORATORIES, INC.
2417 Bond St., University Park, Illinois 60466
Phones: (708) 534-5200 (219) 885-7077 (815) 723-7533

ANALYTICAL REPORT

To: Ecko Housewares
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Wednesday April 11th, 1990

Attn: Mr. Russell Frye

RE: EKLAGE-C1
Project # 2994-02-03-0019
Lab ID: 9002G993-001
Sample Date: 02/26/90
Date Received: 02/27/90
Units: UG/KG

Tentatively Identified Compounds

No Volatile Compounds greater than 10% of the nearest
internal standard were tentatively identified by mass
spectral library search. This is exclusive of any target
compounds, surrogates or internal standards.



WESTON-GULF COAST LABORATORIES, INC.
2417 Bond St., University Park, Illinois 60466
Phones: (708) 534-5200 (219) 885-7077 (815) 723-7533

ANALYTICAL REPORT

To: Ecko Housewares
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Attn: Mr. Russell Frye

Date: Wednesday April 11th, 1990

RE: EKLAGE-C1 TCLP
Project # 2994-02-03-Q019
Lab ID: 9002G993-002
Sample Date: 02/26/90
Date Received: 02/27/90

Inorganic Client Data Report

Parameters	Result	Units	Reporting Limit
Silver, Total	0.030	u mg/L	0.030
Arsenic, Total	0.016	u mg/L	0.016
Barium, Total	0.79	mg/L	0.050
Cadmium, Total	4.9	mg/L	0.0040
Chromium, Total	0.020	u mg/L	0.020
Mercury, Total	0.0010	u mg/L	0.0010
Lead, Total	0.050	u mg/L	0.050
Selenium, Total	0.038	mg/L	0.0080



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ANALYTICAL REPORT

To: Ecko Housewares
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Wednesday April 11th, 1990

Attn: Mr. Russell Frye

RE: EKLAGE-C1 TCLV
Project # 2994-02-03-0019
Lab ID: 9002G993-003
Sample Date: 02/26/90
Date Received: 02/27/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
Chloromethane	BDL	10	U
Bromomethane	BDL	10	U
Vinyl Chloride	BDL	10	U
Chloroethane	BDL	10	U
Methylene Chloride	11	5	T
Acetone	46	10	T
Carbon Disulfide	BDL	5	U
1,1-Dichloroethene	BDL	5	U
1,1-Dichloroethane	BDL	5	U
1,2-Dichloroethene (total)	BDL	5	U
Chloroform	BDL	5	U
1,2-Dichloroethane	BDL	5	U
2-Butanone	BDL	10	U
1,1,1-Trichloroethane	23	5	T
Carbon Tetrachloride	BDL	5	U
Vinyl Acetate	BDL	10	U
Bromodichloromethane	BDL	5	U



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ANALYTICAL REPORT

To: Ecko Housewares
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Wednesday April 11th, 1990

Attn: Mr. Russell Frye

RE: EKLAGE-C1 TCLV
Project # 2994-02-03-0019
Lab ID: 90026993-003
Sample Date: 02/26/90
Date Received: 02/27/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
1,2-Dichloropropane	BDL	5	U
cis-1,3-Dichloropropene	BDL	5	U
Trichloroethene	BDL	5	U
Dibromochloromethane	BDL	5	U
1,1,2-Trichloroethane	BDL	5	U
Benzene	BDL	5	U
Trans-1,3-Dichloropropene	BDL	5	U
Bromoform	BDL	5	U
4-Methyl-2-pentanone	20	10	T
2-Hexanone	BDL	10	U
Tetrachloroethene	BDL	5	U
1,1,2,2-Tetrachloroethane	BDL	5	U
Toluene	BDL	5	U
Chlorobenzene	BDL	5	U
Ethylbenzene	BDL	5	U
Styrene	BDL	5	U
Xylene (total)	BDL	5	U



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ANALYTICAL REPORT

To: Ecko Housewares
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Attn: Mr. Russell Frye

Date: Wednesday April 11th, 1990

RE: EKLAGE-C1 TCLV
Project # 2994-02-03-0019
Lab ID: 9002G993-003
Sample Date: 02/26/90
Date Received: 02/27/90
Units: UG/L

Tentatively Identified Compounds

4 Volatile Compounds greater than 10% of the nearest
internal standard were tentatively identified by mass
spectral library search. This is exclusive of any target
compounds, surrogates or internal standards.

	Retention	Estimated
Volatile Compound	Time	Concentration
Unknown	16.72	10 JT
UNKNOWN C6H12O	20.27	20 J
Ester Propanoic acid C6H12O2	21.08	40 JT
Ester Butanoic acid C7H14O2	25.27	30 JT



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ANALYTICAL REPORT

To: Ecko Housewares
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Attn: Mr. Russell Frye

Date: Wednesday April 11th, 1990

RE: EKLAG-C2
Project # 2994-02-03-0019
Lab ID: 9002G993-004
Sample Date: 02/26/90
Date Received: 02/27/90

Inorganic Client Data Report

Parameters	Result	Units	Reporting Limit
% Solids	64.0	%	0.10



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ANALYTICAL REPORT

To: Ecko Housewares
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Wednesday April 11th, 1990

Attn: Mr. Russell Frye

RE: EKLAG-C2
Project # 2994-02-03-0019
Lab ID: 9002G993-004
Sample Date: 02/26/90
Date Received: 02/27/90
Units: UG/KG

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
Chloromethane	BDL	16	U
Bromomethane	BDL	16	U
Vinyl Chloride	BDL	16	U
Chloroethane	BDL	16	U
Methylene Chloride	170	8	
Acetone	25	16	
Carbon Disulfide	BDL	8	U
1,1-Dichloroethene	BDL	8	U
1,1-Dichloroethane	BDL	8	U
1,2-Dichloroethene (total)	BDL	8	U
Chloroform	BDL	8	U
1,2-Dichloroethane	BDL	8	U
2-Butanone	BDL	16	U
1,1,1-Trichloroethane	5	8	J
Carbon Tetrachloride	BDL	8	U
Vinyl Acetate	BDL	16	U
Bromodichloromethane	BDL	8	U



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ANALYTICAL REPORT

To: Ecko Housewares
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Wednesday April 11th, 1990

Attn: Mr. Russell Frye

RE: EKLAGE-C2
Project # 2994-02-03-0019
Lab ID: 9002G993-004
Sample Date: 02/26/90
Date Received: 02/27/90
Units: UG/KG

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
1,2-Dichloropropane	BDL	8	U
cis-1,3-Dichloropropene	BDL	8	U
Trichloroethene	BDL	8	U
Dibromochloromethane	BDL	8	U
1,1,2-Trichloroethane	BDL	8	U
Benzene	BDL	8	U
Trans-1,3-Dichloropropene	BDL	8	U
Bromoform	BDL	8	U
4-Methyl-2-pentanone	BDL	16	U
2-Hexanone	BDL	16	U
Tetrachloroethene	140	8	
1,1,2,2-Tetrachloroethane	BDL	8	U
Toluene	BDL	8	U
Chlorobenzene	BDL	8	U
Ethylbenzene	BDL	8	U
Styrene	BDL	8	U
Xylene (total)	BDL	8	U



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ANALYTICAL REPORT

To: Ecko Housewares
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Wednesday April 11th, 1990

Attn: Mr. Russell Frye

RE: EKLAGE-C2
Project # 2994-02-03-0019
Lab ID: 90026993-004
Sample Date: 02/26/90
Date Received: 02/27/90
Units: UG/KG

Tentatively Identified Compounds

No Volatile Compounds greater than 10% of the nearest
internal standard were tentatively identified by mass
spectral library search. This is exclusive of any target
compounds, surrogates or internal standards.



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ANALYTICAL REPORT

To: Ecko Housewares
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Attn: Mr. Russell Frye

Date: Wednesday April 11th, 1990

RE: EKLAGE-C2 TCLP
Project # 2994-02-03-0019
Lab ID: 9002G993-005
Sample Date: 02/26/90
Date Received: 02/27/90

Inorganic Client Data Report

Parameters	Result	Units	Reporting Limit
Silver, Total	0.030	u mg/L	0.030
Arsenic, Total	0.016	u mg/L	0.016
Barium, Total	0.77	mg/L	0.050
Cadmium, Total	5.0	mg/L	0.0040
Chromium, Total	0.020	u mg/L	0.020
Mercury, Total	0.0010	u mg/L	0.0010
Lead, Total	0.050	u mg/L	0.050
Selenium, Total	0.038	mg/L	0.0080



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ANALYTICAL REPORT

To: Ecko Housewares
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Wednesday April 11th, 1990

Attn: Mr. Russell Frye

RE: EKLAGE-C2 TCLV
Project # 2994-02-03-0019
Lab ID: 90026993-006
Sample Date: 02/26/90
Date Received: 02/27/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
Chloromethane	BDL	10	U
Bromomethane	BDL	10	U
Vinyl Chloride	BDL	10	U
Chloroethane	BDL	10	U
Methylene Chloride	10	5	T
Acetone	64	10	T
Carbon Disulfide	BDL	5	U
1,1-Dichloroethene	BDL	5	U
1,1-Dichloroethane	BDL	5	U
1,2-Dichloroethene (total)	BDL	5	U
Chloroform	BDL	5	U
1,2-Dichloroethane	BDL	5	U
2-Butanone	BDL	10	U
1,1,1-Trichloroethane	45	5	T
Carbon Tetrachloride	BDL	5	U
Vinyl Acetate	BDL	10	U
Bromodichloromethane	BDL	5	U



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ANALYTICAL REPORT

To: Ecko Housewares
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Wednesday April 11th, 1990

Attn: Mr. Russell Frye

RE: EKLAGE-C2 TCLV
Project # 2994-02-03-0019
Lab ID: 90026993-006
Sample Date: 02/26/90
Date Received: 02/27/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
1,2-Dichloropropane	BDL	5	U
cis-1,3-Dichloropropene	BDL	5	U
Trichloroethene	BDL	5	U
Dibromochloromethane	BDL	5	U
1,1,2-Trichloroethane	BDL	5	U
Benzene	BDL	5	U
Trans-1,3-Dichloropropene	BDL	5	U
Bromoform	BDL	5	U
4-Methyl-2-pentanone	25	10	T
2-Hexanone	BDL	10	U
Tetrachloroethene	BDL	5	U
1,1,2,2-Tetrachloroethane	BDL	5	U
Toluene	BDL	5	U
Chlorobenzene	BDL	5	U
Ethylbenzene	BDL	5	U
Styrene	BDL	5	U
Xylene (total)	BDL	5	U



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To: Ecko Housewares
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254 Welsh Pool Road
Lionville, PA 19353

Date: Wednesday April 11th, 1990

Attn: Mr. Russell Frye

RE: EKLAGE-C2 TCLV
Project # 2994-02-03-0019
Lab ID: 90026993-006
Sample Date: 02/26/90
Date Received: 02/27/90
Units: UG/L

Tentatively Identified Compounds

3 Volatile Compounds greater than 10% of the nearest
internal standard were tentatively identified by mass
spectral library search. This is exclusive of any target
compounds, surrogates or internal standards.

	Retention	Estimated
Volatile Compound	Time	Concentration
Unknown	16.76	10 JT
Ester Propanoic acid C6H12O2	21.09	50 JT
Ester Butanoic acid C7H14O2	25.30	40 JT



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ANALYTICAL REPORT

To: Ecko Housewares
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Wednesday April 11th, 1990

Attn: Mr. Russell Frye

RE: EKLAGE-C2 TCLV
Project # 2994-02-03-0019
Lab ID: 9002G993-006
Sample Date: 02/26/90
Date Received: 02/27/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
Chloromethane	BDL	10	U
Bromomethane	BDL	10	U
Vinyl Chloride	BDL	10	U
Chloroethane	BDL	10	U
Methylene Chloride	5	5	T
Acetone	57	10	T
Carbon Disulfide	BDL	5	U
1,1-Dichloroethene	BDL	5	U
1,1-Dichloroethane	BDL	5	U
1,2-Dichloroethene (total)	BDL	5	U
Chloroform	BDL	5	U
1,2-Dichloroethane	BDL	5	U
2-Butanone	BDL	10	U
1,1,1-Trichloroethane	34	5	T
Carbon Tetrachloride	BDL	5	U
Vinyl Acetate	BDL	10	U
Bromodichloromethane	BDL	5	U



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Date: Wednesday April 11th, 1990

Attn: Mr. Russell Frye

RE: EKLAGE-C2 TCLV
Project # 2994-02-03-0019
Lab ID: 9002G993-006
Sample Date: 02/26/90
Date Received: 02/27/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
1,2-Dichloropropane	BDL	5	U
cis-1,3-Dichloropropene	BDL	5	U
Trichloroethene	BDL	5	U
Dibromochloromethane	BDL	5	U
1,1,2-Trichloroethane	BDL	5	U
Benzene	BDL	5	U
Trans-1,3-Dichloropropene	BDL	5	U
Bromoform	BDL	5	U
4-Methyl-2-pentanone	22	10	T
2-Hexanone	BDL	10	U
Tetrachloroethene	BDL	5	U
1,1,2,2-Tetrachloroethane	BDL	5	U
Toluene	BDL	5	U
Chlorobenzene	BDL	5	U
Ethylbenzene	BDL	5	U
Styrene	BDL	5	U
Xylene (total)	BDL	5	U



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ANALYTICAL REPORT

To: Ecko Housewares
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Wednesday April 11th, 1990

RE: EKLAGE-C3
Project # 2994-02-03-0019
Lab ID: 9002G993-007
Sample Date: 02/26/90
Date Received: 02/27/90

Attn: Mr. Russell Frye

Inorganic Client Data Report

Parameters	Result	Units	Reporting Limit
% Solids	67.5	%	0.10



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ANALYTICAL REPORT

To: Ecko Housewares
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Wednesday April 11th, 1990

Attn: Mr. Russell Frye

RE: EKLAGE-C3
Project # 2994-02-03-0019
Lab ID: 9002G993-007
Sample Date: 02/26/90
Date Received: 02/27/90
Units: UG/KG

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
Chloromethane	BDL	15	U
Bromomethane	BDL	15	U
Vinyl Chloride	BDL	15	U
Chloroethane	BDL	15	U
Methylene Chloride	42	7	
Acetone	21	15	B
Carbon Disulfide	BDL	7	U
1,1-Dichloroethene	BDL	7	U
1,1-Dichloroethane	BDL	7	U
1,2-Dichloroethene (total)	BDL	7	U
Chloroform	BDL	7	U
1,2-Dichloroethane	BDL	7	U
2-Butanone	BDL	15	U
1,1,1-Trichloroethane	12	7	
Carbon Tetrachloride	BDL	7	U
Vinyl Acetate	BDL	15	U
Bromodichloromethane	BDL	7	U



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ANALYTICAL REPORT

To: Ecko Housewares
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Wednesday April 11th, 1990

Attn: Mr. Russell Frye

RE: EKLAGE-C3
Project # 2994-02-03-0019
Lab ID: 9002G993-007
Sample Date: 02/26/90
Date Received: 02/27/90
Units: UG/KG

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
1,2-Dichloropropane	BDL	7	U
cis-1,3-Dichloropropene	BDL	7	U
Trichloroethene	BDL	7	U
Dibromochloromethane	BDL	7	U
1,1,2-Trichloroethane	BDL	7	U
Benzene	BDL	7	U
Trans-1,3-Dichloropropene	BDL	7	U
Bromoform	BDL	7	U
4-Methyl-2-pentanone	BDL	15	U
2-Hexanone	BDL	15	U
Tetrachloroethene	44	7	
1,1,2,2-Tetrachloroethane	BDL	7	U
Toluene	BDL	7	U
Chlorobenzene	BDL	7	U
Ethylbenzene	BDL	7	U
Styrene	BDL	7	U
Xylene (total)	BDL	7	U



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ANALYTICAL REPORT

To: Ecko Housewares
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Lionville, PA 19353

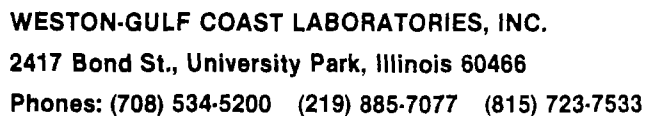
Date: Wednesday April 11th, 1990

Attn: Mr. Russell Frye

RE: EKLAG-C3
Project # 2994-02-03-0019
Lab ID: 9002G993-007
Sample Date: 02/26/90
Date Received: 02/27/90
Units: UG/KG

Tentatively Identified Compounds

No Volatile Compounds greater than 10% of the nearest
internal standard were tentatively identified by mass
spectral library search. This is exclusive of any target
compounds, surrogates or internal standards.



To: Ecko Housewares
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

RE: **EKLAG-C3 TCLP**
Project # 2994-02-03-0019
Lab ID: **9002G993-008**
Sample Date: 02/26/90
Date Received: 02/27/90

Inorganic Client Data Report

Parameters	Result	Units	Reporting Limit
Silver, Total	0.030 u	mg/L	0.030
Arsenic, Total	0.016 u	mg/L	0.016
Barium, Total	0.76	mg/L	0.050
Cadmium, Total	4.8	mg/L	0.0040
Chromium, Total	0.020 u	mg/L	0.020
Mercury, Total	0.0010 u	mg/L	0.0010
Lead, Total	0.050 u	mg/L	0.050
Selenium, Total	0.042	mg/L	0.0080



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ANALYTICAL REPORT

To: Ecko Housewares
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Wednesday April 11th, 1990

Attn: Mr. Russell Frye

RE: EKLAGE-C3 TCLV
Project # 2994-02-03-0019
Lab ID: 9002G993-009
Sample Date: 02/26/90
Date Received: 02/27/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
1,2-Dichloropropane	BDL	5	U
cis-1,3-Dichloropropene	BDL	5	U
Trichloroethene	BDL	5	U
Dibromochloromethane	BDL	5	U
1,1,2-Trichloroethane	BDL	5	U
Benzene	BDL	5	U
Trans-1,3-Dichloropropene	BDL	5	U
Bromoform	BDL	5	U
4-Methyl-2-pentanone	24	10	T
2-Hexanone	BDL	10	U
Tetrachloroethene	BDL	5	U
1,1,2,2-Tetrachloroethane	BDL	5	U
Toluene	BDL	5	U
Chlorobenzene	BDL	5	U
Ethylbenzene	BDL	5	U
Styrene	BDL	5	U
Xylene (total)	BDL	5	U



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ANALYTICAL REPORT

To: Ecko Housewares
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Wednesday April 11th, 1990

Attn: Mr. Russell Frye

RE: EKLAGE-C3 TCLV
Project # 2994-02-03-0019
Lab ID: 9002G993-009
Sample Date: 02/26/90
Date Received: 02/27/90
Units: UG/L

Tentatively Identified Compounds

3 Volatile Compounds greater than 10% of the nearest
internal standard were tentatively identified by mass
spectral library search. This is exclusive of any target
compounds, surrogates or internal standards.

	Retention	Estimated
Volatile Compound	Time	Concentration
Unknown	16.73	10 JT
Ester Propanoic acid C6H12O2	21.10	40 JT
Ester Butanoic acid C7H14O2	25.28	30 JT



WESTON-GULF COAST LABORATORIES, INC.

2417 Bond St., University Park, Illinois 60466

Phones: (312) 534-5200 (219) 885-7077 (315) 723-7533

April 3, 1990

Mr. Russell Frye
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Dear Mr. Frye:

Please find enclosed the analytical reports for the samples submitted to Weston/Gulf Coast Laboratories for analyses. They were identified as follows:

Project: Ecko Houseware
WO#: 2994-02-03-0019

CLIENT ID	LAB ID#	SAMPLE DATE	DATE RECEIVED
ENRICO A TCLP	9003G234-002	03/08/90	03/09/90
ENRICO A TCLV	9003G234-003	03/08/90	03/09/90
ENRICO B TCLP	9003G234-005	03/08/90	03/09/90
ENRICO B TCLV	9003G234-006	03/08/90	03/09/90

If you have any questions, please contact Sheryl Johnson at our laboratories.

Sincerely,

WESTON/GULF COAST LABORATORIES

John Boudreau
John Boudreau
Laboratory Manager

Jeff A. Kaczinski
Jeff A. Kaczinski
GC/MS Unit Leader

jvb

Enclosures

Michael J. Healy
Michael J. Healy
Project Manager
Mani S. Iyer
Mani S. Iyer
Metals Unit Leader



WESTON-GULF COAST LABORATORIES, INC.

2417 Bond St., University Park, Illinois 60466

Phones: (312) 534-5200 (219) 885-7077 (815) 723-7533

CASE NARRATIVE

VOA, BNA GC/MS

WESTON/Gulf Coast
Ecko Houseware
RFW# 9003G234

VOA DATA:

1. All initial analyses were performed within the recommended hold time.
2. All Method Blank target compounds were below Contract Required Quantitation Limits (CRQL). (** or five times the CRQL for the following compounds: methylene chloride, acetone, toluene, 2-butanone).
3. All LCS (Method Blank Spike) recoveries were within recommended limits.
4. Matrix spike analyses were conducted on another sample that was analyzed with this set.
5. All surrogate recoveries in the volatile analyses were within USEPA QC limits.
6. Weston-Gulf Coast uses the following GC/MS systems which can be identified on all raw data by either the Instrument ID or the quantitation file ID:

ID #	Instrument	Quant ID File
GCL#1	Hewlett Packard 5970 MSD	ID_MS1
GCL#2	Hewlett Packard 5996	ID_MS2
GCL#3	Hewlett Packard 5996	ID_MS3
GCL#4	Hewlett Packard 5970 MSD	ID_MS4

All analyses were performed using Method SW846-8240 unless otherwise noted. The Internal Standard and Surrogate peaks are labeled by name.

7. All of the samples were analyzed as low level waters following an initial TCLP extraction procedure and therefore normal detection limits apply.

Jeff A. Kazinski / GC/MS Unit Leader
Name/Title

3-27-90
Date

DATA QUALIFIERS

- u - Indicates an inorganic compound was analyzed for but not detected.
- U - Indicates an organic compound was analyzed for but not detected.
- J - Indicates an estimated value for either a TIC or an analyte that meets the identification criteria but the result is less than the specified detection limit.
- B - Indicates the compound was found in the blank and the sample.
- T - Indicates the compound was found in the TCLP extraction blank and the sample.
- E - Concentrations exceed calibration range of the instrument.
- I - Indicates Interference.
- BS - Indicates matrix analyses were conducted on reagent grade water.
- BSD - Blank Spike Duplicate
- BDL - Below Detection Limit
- MS - Matrix Spike
- MSD - Matrix Spike Duplicate
- D - Indicates that surrogate/matrix spike recoveries were not obtained because the extract had to be diluted for analysis.
- DL - Indicates a secondary dilution
- NA - Not Applicable
- DF - Dilution factor

NOTES:

Solid, sediment and sludge results are reported on a dry weight basis except when analyzed for Landfill disposal parameters (such as incineration or Illinois Green Sheet parameters). All other mg/kg results are reported on an "as received" basis.

Reporting limits are detection limits adjusted for sample size used, dilutions made, and in the case of dry weight results, the moisture content of the sample.

WESTON Analytics Use Only

Custody Transfer Record/Lab Work Request




Client _____

Work Order _____

Date Rec'd. _____ Date Due _____

RFW Contact _____

Client Contact/Phone _____

Refrigerator#								
#/Type Container								
Volume								
Preservative								
ANALYSES REQUESTED 								

WESTON Analytics
Use Only

Samples Were:
1 Shipped or Hand-Delivered
NOTES:

2 Ambient or Chilled
NOTES:

3 Received Broken/
Leaking (Improperly
Sealed)
Y N

NOTES:

4 Properly Preserved
Y N

NOTES:

5 Received Within
Holding Times
Y N

NOTES:

COC Tape Was:

1 Present on Outer Package	Y	N
----------------------------	---	---

2 Unbroken on Outer Package	Y	N
-----------------------------	---	---

3 Present on Sample
Y N

4 Unbroken on Sample
NOTES: Y N

COC Record Was:

1 Present Upon Receipt
of Samples Y N

Discrepancies Between
Sample Labels and COC
Record? Y N

NOTES:

Matrix:	W - Water	DS - Drum Solids
S - Soil	O - Oil	DL - Drum Liquids
SE - Sediment	A - Air	F - Fish
SO - Solid	WI - Wipe	X - Other

Special Instructions:

72: P, 100000 YCA + 100000
 73: 45000 100000

[illegible]



WESTON-GULF COAST LABORATORIES, INC.

2417 Bond St., University Park, Illinois 60466

Phones: (708) 534-5200 (219) 885-7077 (815) 723-7533

ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Attn: Mr. Russell Frye

Date: Tuesday April 3rd, 1990

RE: ENRICO A TCLP
Project # 2994-02-03-0019
Lab ID: 9003G234-002
Sample Date: 03/08/90
Date Received: 03/09/90

Inorganic Client Data Report

Parameters	Result	Units	Reporting Limit
Silver, Total	0.030 u	mg/L	0.030
Arsenic, Total	0.016 u	mg/L	0.016
Barium, Total	0.43	mg/L	0.050
Cadmium, Total	0.0040 u	mg/L	0.0040
Chromium, Total	0.060	mg/L	0.020
Mercury, Total	0.0010 u	mg/L	0.0010
Lead, Total	0.050 u	mg/L	0.050
Selenium, Total	0.050	mg/L	0.0080



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2417 Bond St., University Park, Illinois 60466
Phones: (708) 534-5200 (219) 885-7077 (815) 723-7533

ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Tuesday March 27th, 1990

Attn: Mr. Russell Frye

RE: ENRICO A TCLV
Project # 2994-02-03-0019
Lab ID: 9003G234-003
Sample Date: 03/08/90
Date Received: 03/09/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
Chloromethane	BDL	10	U
Bromomethane	BDL	10	U
Vinyl Chloride	BDL	10	U
Chloroethane	BDL	10	U
Methylene Chloride	5	5	T
Acetone	150	10	T
Carbon Disulfide	BDL	5	U
1,1-Dichloroethene	BDL	5	U
1,1-Dichloroethane	BDL	5	U
1,2-Dichloroethene (total)	BDL	5	U
Chloroform	BDL	5	U
1,2-Dichloroethane	BDL	5	U
2-Butanone	19	10	
1,1,1-Trichloroethane	BDL	5	U
Carbon Tetrachloride	BDL	5	U
Vinyl Acetate	BDL	10	U
Bromodichloromethane	BDL	5	U



WESTON-GULF COAST LABORATORIES, INC.
2417 Bond St., University Park, Illinois 60466
Phones: (708) 534-5200 (219) 885-7077 (815) 723-7533

ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Tuesday March 27th, 1990

Attn: Mr. Russell Frye

RE: ENRICO A TCLV
Project # 2994-02-03-0019
Lab ID: 9003G234-003
Sample Date: 03/08/90
Date Received: 03/09/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
1,2-Dichloropropane	BDL	5	U
cis-1,3-Dichloropropene	BDL	5	U
Trichloroethene	BDL	5	U
Dibromochloromethane	BDL	5	U
1,1,2-Trichloroethane	BDL	5	U
Benzene	BDL	5	U
Trans-1,3-Dichloropropene	BDL	5	U
Bromoform	BDL	5	U
4-Methyl-2-pentanone	28	10	T
2-Hexanone	BDL	10	U
Tetrachloroethene	BDL	5	U
1,1,2,2-Tetrachloroethane	BDL	5	U
Toluene	BDL	5	U
Chlorobenzene	BDL	5	U
Ethylbenzene	BDL	5	U
Styrene	BDL	5	U
Xylene (total)	BDL	5	U



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ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Tuesday March 27th, 1990

Attn: Mr. Russell Frye

RE: ENRICO A TCLV
Project # 2994-02-03-0019
Lab ID: 9003G234-003
Sample Date: 03/08/90
Date Received: 03/09/90
Units: UG/L

Tentatively Identified Compounds

No Volatile Compounds greater than 10% of the nearest
internal standard were tentatively identified by mass
spectral library search. This is exclusive of any target
compounds, surrogates or internal standards.



WESTON-GULF COAST LABORATORIES, INC.
2417 Bond St., University Park, Illinois 60466
Phones: (708) 534-5200 (219) 885-7077 (815) 723-7533

ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Attn: Mr. Russell Frye

Date: Tuesday April 3rd, 1990

RE: ENRICO B TCLP
Project # 2994-02-03-0019
Lab ID: 9003G234-005
Sample Date: 03/08/90
Date Received: 03/09/90

Inorganic Client Data Report

Parameters	Result	Units	Reporting Limit
Silver, Total	0.030 u	mg/L	0.030
Arsenic, Total	0.016 u	mg/L	0.016
Barium, Total	0.78	mg/L	0.050
Cadmium, Total	0.0040 u	mg/L	0.0040
Chromium, Total	0.079	mg/L	0.020
Mercury, Total	0.0010 u	mg/L	0.0010
Lead, Total	0.050 u	mg/L	0.050
Selenium, Total	0.051	mg/L	0.0080



WESTON-GULF COAST LABORATORIES, INC.
2417 Bond St., University Park, Illinois 60466
Phones: (708) 534-5200 (219) 885-7077 (815) 723-7533

ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Tuesday March 27th, 1990

Attn: Mr. Russell Frye

RE: ENRICO B TCLV
Project # 2994-02-03-0019
Lab ID: 9003G234-006
Sample Date: 03/08/90
Date Received: 03/09/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
Chloromethane	BDL	10	U
Bromomethane	BDL	10	U
Vinyl Chloride	BDL	10	U
Chloroethane	BDL	10	U
Methylene Chloride	5	5	T
Acetone	120	10	T
Carbon Disulfide	BDL	5	U
1,1-Dichloroethene	BDL	5	U
1,1-Dichloroethane	BDL	5	U
1,2-Dichloroethene (total)	BDL	5	U
Chloroform	BDL	5	U
1,2-Dichloroethane	BDL	5	U
2-Butanone	BDL	10	U
1,1,1-Trichloroethane	BDL	5	U
Carbon Tetrachloride	BDL	5	U
Vinyl Acetate	BDL	10	U
Bromodichloromethane	BDL	5	U



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2417 Bond St., University Park, Illinois 60466
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ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Tuesday March 27th, 1990

Attn: Mr. Russell Frye

RE: ENRICO B TCLV
Project # 2994-02-03-0019
Lab ID: 9003G234-006
Sample Date: 03/08/90
Date Received: 03/09/90
Units: UG/L

Tentatively Identified Compounds

No Volatile Compounds greater than 10% of the nearest
internal standard were tentatively identified by mass
spectral library search. This is exclusive of any target
compounds, surrogates or internal standards.



WESTON-GULF COAST LABORATORIES, INC.
2417 Bond St., University Park, Illinois 60466
Phones: (708) 534-5200 (219) 885-7077 (815) 723-7533

ANALYTICAL REPORT

To: Ecko Housewares
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Wednesday April 11th, 1990

Attn: Mr. Russell Frye

RE: EKLAGE-C3 TCLV
Project # 2994-02-03-0019
Lab ID: 9002G993-009
Sample Date: 02/26/90
Date Received: 02/27/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
Chloromethane	BDL	10	U
Bromomethane	BDL	10	U
Vinyl Chloride	BDL	10	U
Chloroethane	BDL	10	U
Methylene Chloride	14	5	T
Acetone	250	10	T
Carbon Disulfide	BDL	5	U
1,1-Dichloroethene	BDL	5	U
1,1-Dichloroethane	BDL	5	U
1,2-Dichloroethene (total)	BDL	5	U
Chloroform	BDL	5	U
1,2-Dichloroethane	BDL	5	U
2-Butanone	BDL	10	U
1,1,1-Trichloroethane	32	5	T
Carbon Tetrachloride	BDL	5	U
Vinyl Acetate	BDL	10	U
Bromodichloromethane	BDL	5	U



WESTON-GULF COAST LABORATORIES, INC.
2417 Bond St., University Park, Illinois 60466
Phones: (708) 534-5200 (219) 885-7077 (815) 723-7533

ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Tuesday March 27th, 1990

Attn: Mr. Russell Frye

RE: ENRICO B TCLV
Project # 2994-02-03-0019
Lab ID: 9003G234-006 PREP
Sample Date: 03/08/90
Date Received: 03/09/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
1,2-Dichloropropane	BDL	5	U
cis-1,3-Dichloropropene	BDL	5	U
Trichloroethene	BDL	5	U
Dibromochloromethane	BDL	5	U
1,1,2-Trichloroethane	BDL	5	U
Benzene	BDL	5	U
Trans-1,3-Dichloropropene	BDL	5	U
Bromoform	BDL	5	U
4-Methyl-2-pentanone	23	10	T
2-Hexanone	BDL	10	U
Tetrachloroethene	BDL	5	U
1,1,2,2-Tetrachloroethane	BDL	5	U
Toluene	BDL	5	U
Chlorobenzene	BDL	5	U
Ethylbenzene	BDL	5	U
Styrene	BDL	5	U
Xylene (total)	BDL	5	U



WESTON-GULF COAST LABORATORIES, INC.

2417 Bond St., University Park, Illinois 60466

Phones: (312) 534-5200 (219) 885-7077 (315) 723-7533

April 18, 1990

Mr. Russell Frye
Roy F. Weston, Inc.
254 Welsh Pool Road
Lionville, PA 19353

Dear Mr. Frye:

Please find enclosed the analytical reports for the samples submitted to Weston/Gulf Coast Laboratories for analyses. They were identified as follows:

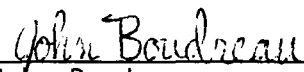
PROJECT NAME: Ecko Housewares

CLIENT ID	LAB ID#	SAMPLE DATE	DATE RECEIVED
Harmon AHG	9003G534-001	03/23/90	03/23/90
Harmon AHG TCLP	9003G534-002	03/23/90	03/23/90
Harmon AHG TCLV	9003G534-003	03/23/90	03/23/90

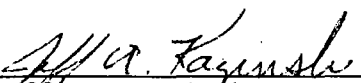
If you have any questions, please contact Sheryl Johnson at our laboratories.

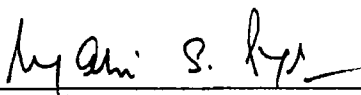
Sincerely,

WESTON/GULF COAST LABORATORIES


John Boudreau
Laboratory Manager


Michael J. Healy
Project Manager


Jeff A. Kaczinski
GC/MS Unit Leader


Mani S. Iyer
Metals Unit Leader

sj

Enclosures



WESTON-GULF COAST LABORATORIES, INC.
2417 Bond St., University Park, Illinois 60466
Phones: (708) 534-5200 (219) 885-7077 (815) 723-7533

ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Tuesday March 27th, 1990

Attn: Mr. Russell Frye

RE: ENRICO B TCLV
Project # 2994-02-03-0019
Lab ID: 9003G234-006
Sample Date: 03/08/90
Date Received: 03/09/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
1,2-Dichloropropane	BDL	5	U
cis-1,3-Dichloropropene	BDL	5	U
Trichloroethene	BDL	5	U
Dibromochloromethane	BDL	5	U
1,1,2-Trichloroethane	BDL	5	U
Benzene	BDL	5	U
Trans-1,3-Dichloropropene	BDL	5	U
Bromoform	BDL	5	U
4-Methyl-2-pentanone	25	10	T
2-Hexanone	BDL	10	U
Tetrachloroethene	BDL	5	U
1,1,2,2-Tetrachloroethane	BDL	5	U
Toluene	BDL	5	U
Chlorobenzene	BDL	5	U
Ethylbenzene	BDL	5	U
Styrene	BDL	5	U
Xylene (total)	BDL	5	U



WESTON-GULF COAST LABORATORIES, INC.
2417 Bond St., University Park, Illinois 60466
Phones: (708) 534-5200 (219) 885-7077 (815) 723-7533

ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Tuesday March 27th, 1990

Attn: Mr. Russell Frye

RE: ENRICO B TCLV
Project # 2994-02-03-0019
Lab ID: 9003G234-006 REPREP
Sample Date: 03/08/90
Date Received: 03/09/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
Chloromethane	BDL	10	U
Bromomethane	BDL	10	U
Vinyl Chloride	BDL	10	U
Chloroethane	BDL	10	U
Methylene Chloride	4	5	TJ
Acetone	120	10	T
Carbon Disulfide	BDL	5	U
1,1-Dichloroethene	BDL	5	U
1,1-Dichloroethane	BDL	5	U
1,2-Dichloroethene (total)	BDL	5	U
Chloroform	BDL	5	U
1,2-Dichloroethane	BDL	5	U
2-Butanone	BDL	10	U
1,1,1-Trichloroethane	BDL	5	U
Carbon Tetrachloride	BDL	5	U
Vinyl Acetate	BDL	10	U
Bromodichloromethane	BDL	5	U



WESTON-GULF COAST LABORATORIES, INC.

2417 Bond St., University Park, Illinois 60466

Phones: (312) 534-5200 (219) 885-7077 (815) 723-7533

CASE NARRATIVE

VOA, BNA GC/MS

WESTON/Gulf Coast
Ecko Houseware
RFW# 9003G534

VOA DATA:

1. All initial analyses were performed within the recommended hold time.
2. All Method Blank target compounds were below Contract Required Quantitation Limits (CRQL). (** or five times the CRQL for the following compounds: methylene chloride, acetone, toluene, 2-butanone).
3. All LCS (Method Blank Spike) recoveries were within recommended limits.
4. Matrix spike analyses were conducted on another sample that was analyzed with this set.
5. All surrogate recoveries in the volatile analyses were within USEPA QC limits.
6. Weston-Gulf Coast uses the following GC/MS systems which can be identified on all raw data by either the Instrument ID or the quantitation file ID:

ID #	Instrument	Quant ID File
GCL#1	Hewlett Packard 5970 MSD	ID_MS1
GCL#2	Hewlett Packard 5996	ID_MS2
GCL#3	Hewlett Packard 5996	ID_MS3
GCL#4	Hewlett Packard 5970 MSD	ID_MS4

All analyses were performed using Method SW846-8240 unless otherwise noted. The Internal Standard and Surrogate peaks are labeled by name.

7. All of the samples were analyzed as low level waters following an initial TCLP extraction procedure and therefore normal detection limits apply.

Jeff A. Karginsh / GC/MS Unit Leader
Name/Title

4-13-90
Date

DATA QUALIFIERS

- u - Indicates an inorganic compound was analyzed for but not detected.
- U - Indicates an organic compound was analyzed for but not detected.
- J - Indicates an estimated value for either a TIC or an analyte that meets the identification criteria but the result is less than the specified detection limit.
- B - Indicates the compound was found in the blank and the sample.
- T - Indicates the compound was found in the TCLP extraction blank and the sample.
- E - Concentrations exceed calibration range of the instrument.
- I - Indicates Interference.
- BS - Indicates matrix analyses were conducted on reagent grade water.
- BSD - Blank Spike Duplicate
- BDL - Below Detection Limit
- MS - Matrix Spike
- MSD - Matrix Spike Duplicate
- D - Indicates that surrogate/matrix spike recoveries were not obtained because the extract had to be diluted for analysis.
- DL - Indicates a secondary dilution
- NA - Not Applicable
- DF - Dilution factor
- X - Result is by calculation

NOTES:

Solid, sediment and sludge results are reported on a dry weight basis except when analyzed for Landfill disposal parameters (such as incineration or Illinois Green Sheet parameters). All other mg/kg results are reported on an "as received" basis.

Reporting limits are detection limits adjusted for sample size used, dilutions made, and in the case of dry weight results, the moisture content of the sample.

WESTON Analytics Use Only

Custody Transfer Record/Lab Work Request

Client _____
 Work Order _____
 Date Rec'd. _____ Date Due _____
 RFW Contact _____
 Client Contact/Phone _____

WA Use Only
Lab ID

Client ID/Description	Client Type	Client Address	Client Phone	Client Email	Client Website	Client Status	Client Notes
101	Individual	123 Main St, New York, NY 10001	212-555-1234	john.doe@example.com	www.johndoe.com	Active	Client since 2010. Regularly updates profile.
102	Individual	456 Elm St, Los Angeles, CA 90001	310-555-5678	jane.smith@example.com	www.janesmith.com	Active	Client since 2012. Regularly updates profile.
103	Individual	789 Oak St, Chicago, IL 60601	312-555-9012	mike.jones@example.com	www.mikejones.com	Active	Client since 2011. Regularly updates profile.
104	Individual	101 Pine St, San Francisco, CA 94101	415-555-3456	emma.watson@example.com	www.emmawatson.com	Active	Client since 2013. Regularly updates profile.
105	Individual	202 Maple St, Houston, TX 77001	281-555-7890	alex.brown@example.com	www.alexbrown.com	Active	Client since 2014. Regularly updates profile.
106	Individual	303 Cedar St, Phoenix, AZ 85001	602-555-2345	lisa.white@example.com	www.lisawhite.com	Active	Client since 2015. Regularly updates profile.
107	Individual	404 Birch St, Portland, OR 97201	503-555-6789	chris.green@example.com	www.chrisgreen.com	Active	Client since 2016. Regularly updates profile.
108	Individual	505 Spruce St, Denver, CO 80201	303-555-0123	amy.black@example.com	www.amyblack.com	Active	Client since 2017. Regularly updates profile.
109	Individual	606 Ash St, Seattle, WA 98101	206-555-4567	ryan.gray@example.com	www.ryangray.com	Active	Client since 2018. Regularly updates profile.
110	Individual	707 Hickory St, Miami, FL 33101	305-555-8901	nicole.pink@example.com	www.nicolepink.com	Active	Client since 2019. Regularly updates profile.
111	Individual	808 Walnut St, Dallas, TX 75201	214-555-2345	kevin.blue@example.com	www.kevinblue.com	Active	Client since 2020. Regularly updates profile.
112	Individual	909 Cherry St, San Antonio, TX 78201	210-555-6789	stephanie.purple@example.com	www.stephaniepurple.com	Active	Client since 2021. Regularly updates profile.
113	Individual	1010 Peach St, Austin, TX 78701	512-555-0123	daniel.teal@example.com	www.danielteal.com	Active	Client since 2022. Regularly updates profile.
114	Individual	1111 Apple St, Fort Worth, TX 76101	817-555-4567	maria.pink@example.com	www.mariapink.com	Active	Client since 2023. Regularly updates profile.
115	Individual	1212 Banana St, El Paso, TX 79901	910-555-8901	joshua.brown@example.com	www.joshuabrown.com	Active	Client since 2024. Regularly updates profile.
116	Individual	1313 Orange St, San Diego, CA 92101	619-555-2345	olivia.pink@example.com	www.oliviapink.com	Active	Client since 2025. Regularly updates profile.
117	Individual	1414 Grape St, San Jose, CA 95101	408-555-6789	noah.purple@example.com	www.noahpurple.com	Active	Client since 2026. Regularly updates profile.
118	Individual	1515 Lemon St, San Francisco, CA 94101	415-555-0123	isabella.pink@example.com	www.isabellapink.com	Active	Client since 2027. Regularly updates profile.
119	Individual	1616 Lime St, San Francisco, CA 94101	415-555-4567	lucas.purple@example.com	www.lucaspurple.com	Active	Client since 2028. Regularly updates profile.
120	Individual	1717 Strawberry St, San Francisco, CA 94101	415-555-8901	emma.pink@example.com	www.emmapink.com	Active	Client since 2029. Regularly updates profile.
121	Individual	1818 Raspberry St, San Francisco, CA 94101	415-555-2345	oliver.purple@example.com	www.oliverpurple.com	Active	Client since 2030. Regularly updates profile.
122	Individual	1919 Blueberry St, San Francisco, CA 94101	415-555-6789	ava.pink@example.com	www.avapink.com	Active	Client since 2031. Regularly updates profile.
123	Individual	2020 Blackberry St, San Francisco, CA 94101	415-555-0123	liam.purple@example.com	www.liampurple.com	Active	Client since 2032. Regularly updates profile.
124	Individual	2121 Elderberry St, San Francisco, CA 94101	415-555-4567	mia.pink@example.com	www.miapink.com	Active	Client since 2033. Regularly updates profile.
125	Individual	2222 Mulberry St, San Francisco, CA 94101	415-555-8901	noah.purple@example.com	www.noahpurple.com	Active	Client since 2034. Regularly updates profile.
126	Individual	2323 Fig St, San Francisco, CA 94101	415-555-2345	isabella.pink@example.com	www.isabellapink.com	Active	Client since 2035. Regularly updates profile.
127	Individual	2424 Pomegranate St, San Francisco, CA 94101	415-555-6789	lucas.purple@example.com	www.lucaspurple.com	Active	Client since 2036. Regularly updates profile.
128	Individual	2525 Peach St, San Francisco, CA 94101	415-555-0123	emma.pink@example.com	www.emmapink.com	Active	Client since 2037. Regularly updates profile.
129	Individual	2626 Apple St, San Francisco, CA 94101	415-555-4567	oliver.purple@example.com	www.oliverpurple.com	Active	Client since 2038. Regularly updates profile.
130	Individual	2727 Banana St, San Francisco, CA 94101	415-555-8901	ava.pink@example.com	www.avapink.com	Active	Client since 2039. Regularly updates profile.
131	Individual	2828 Orange St, San Francisco, CA 94101	415-555-2345	liam.purple@example.com	www.liampurple.com	Active	Client since 2040. Regularly updates profile.
132	Individual	2929 Grape St, San Francisco, CA 94101	415-555-6789	isabella.pink@example.com	www.isabellapink.com	Active	Client since 2041. Regularly updates profile.
133	Individual	3030 Lemon St, San Francisco, CA 94101	415-555-0123	lucas.purple@example.com	www.lucaspurple.com	Active	Client since 2042. Regularly updates profile.
134	Individual	3131 Lime St, San Francisco, CA 94101	415-555-4567	emma.pink@example.com	www.emmapink.com	Active	Client since 2043. Regularly updates profile.
135	Individual	3232 Strawberry St, San Francisco, CA 94101	415-555-8901	oliver.purple@example.com	www.oliverpurple.com	Active	Client since 2044. Regularly updates profile.
136	Individual	3333 Raspberry St, San Francisco, CA 94101	415-555-2345	ava.pink@example.com	www.avapink.com	Active	Client since 204

Refrigerator#

#/Type Container

Volume

Preservative

ANALYSES REQUESTED

Matrix

Date Collected

Matrix:	W - Water	DS - Drum Solids
S - Soil	O - Oil	DL - Drum Liquids
SE - Sediment	A - Air	F - Fish
SO - Solid	WI - Wipe	X - Other

Special Instructions:

**WESTON Analytics
Use Only**

Samples Were:

1 Shipped or Hand-Delivered

NOTES:

2 Ambient or Chilled
NOTES:

**3 Received Broken/
Leaking (Improperly
Sealed)**

Y N

NOTES:

4 Properly Preserved

Y N

NOTES:

5 Received Within Holding Times

Y N

NOTES:

COC Tape Was:

1 Present on Outer Package	Y	N
-------------------------------	---	---

2 Unbroken on Outer
Package Y N

3 Present on Sample
Y N

4 Unbroken on Sample
NOTES: Y N

COC Record Was:

1 Present Upon Receipt
of Samples Y N

Discrepancies Between Sample Labels and COC Record?	Y	N
---	---	---

NOTES:

[illegible]



WESTON-GULF COAST LABORATORIES, INC.
2417 Bond St., University Park, Illinois 60466
Phones: (708) 534-5200 (219) 885-7077 (815) 723-7533

ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Attn: Mr. Russell Frye

Date: Wednesday April 18th, 1990

RE: Harmon AHG TCLP
Project # 2994-02-03-0019
Lab ID: 9003G534-002
Sample Date: 03/23/90
Date Received: 03/26/90

Inorganic Client Data Report

Parameters	Result	Units	Reporting Limit
Silver, Total	0.030 u	mg/L	0.030
Arsenic, Total	0.016 u	mg/L	0.016
Barium, Total	0.47	mg/L	0.050
Cadmium, Total	0.0040 u	mg/L	0.0040
Chromium, Total	0.14	mg/L	0.020
Mercury, Total	0.0010 u	mg/L	0.0010
Lead, Total	0.050 u	mg/L	0.050
Selenium, Total	0.041	mg/L	0.0080



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ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Thursday April 12th, 1990

Attn: Mr. Russell Frye

RE: Harmon AHG TCLV
Project # 2994-02-03-0019
Lab ID: 9003G534-003
Sample Date: 03/23/90
Date Received: 03/26/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
Chloromethane	BDL	10	U
Bromomethane	BDL	10	U
Vinyl Chloride	BDL	10	U
Chloroethane	BDL	10	U
Methylene Chloride	35	5	T
Acetone	92	10	T
Carbon Disulfide	BDL	5	U
1,1-Dichloroethene	BDL	5	U
1,1-Dichloroethane	BDL	5	U
1,2-Dichloroethene (total)	BDL	5	U
Chloroform	BDL	5	U
1,2-Dichloroethane	BDL	5	U
2-Butanone	BDL	10	U
1,1,1-Trichloroethane	BDL	5	U
Carbon Tetrachloride	BDL	5	U
Vinyl Acetate	BDL	10	U
Bromodichloromethane	BDL	5	U



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ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Thursday April 12th, 1990

Attn: Mr. Russell Frye

RE: Harmon AHG TCLV
Project # 2994-02-03-0019
Lab ID: 90036534-003
Sample Date: 03/23/90
Date Received: 03/26/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
1,2-Dichloropropane	BDL	5	U
cis-1,3-Dichloropropene	BDL	5	U
Trichloroethene	BDL	5	U
Dibromochloromethane	BDL	5	U
1,1,2-Trichloroethane	BDL	5	U
Benzene	BDL	5	U
Trans-1,3-Dichloropropene	BDL	5	U
Bromoform	BDL	5	U
4-Methyl-2-pentanone	BDL	10	U
2-Hexanone	BDL	10	U
Tetrachloroethene	BDL	5	U
1,1,2,2-Tetrachloroethane	BDL	5	U
Toluene	BDL	5	U
Chlorobenzene	BDL	5	U
Ethylbenzene	BDL	5	U
Styrene	BDL	5	U
Xylene (total)	BDL	5	U



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ANALYTICAL REPORT

To: Ecco Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Thursday April 12th, 1990

Attn: Mr. Russell Frye

RE: Harmon AHG TCLV
Project # 2994-02-03-0019
Lab ID: 9003G534-003
Sample Date: 03/23/90
Date Received: 03/26/90
Units: UG/L

Tentatively Identified Compounds

No Volatile Compounds greater than 10% of the nearest
internal standard were tentatively identified by mass
spectral library search. This is exclusive of any target
compounds, surrogates or internal standards.



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ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Friday April 13th, 1990

Attn: Mr. Russell Frye

RE: Harmon AHG TCLV
Project # 2994-02-03-0019
Lab ID: 9003G534-003 REPREP
Sample Date: 03/23/90
Date Received: 03/26/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
Chloromethane	BDL	10	U
Bromomethane	BDL	10	U
Vinyl Chloride	BDL	10	U
Chloroethane	BDL	10	U
Methylene Chloride	36	5	T
Acetone	110	10	T
Carbon Disulfide	BDL	5	U
1,1-Dichloroethene	BDL	5	U
1,1-Dichloroethane	BDL	5	U
1,2-Dichloroethene (total)	BDL	5	U
Chloroform	BDL	5	U
1,2-Dichloroethane	BDL	5	U
2-Butanone	BDL	10	U
1,1,1-Trichloroethane	BDL	5	U
Carbon Tetrachloride	BDL	5	U
Vinyl Acetate	BDL	10	U
Bromodichloromethane	BDL	5	U



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ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Friday April 13th, 1990

Attn: Mr. Russell Frye

RE: Harmon AHG TCLV
Project # 2994-02-03-0019
Lab ID: 9003G534-003 REPREP
Sample Date: 03/23/90
Date Received: 03/26/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
1,2-Dichloropropane	BDL	5	U
cis-1,3-Dichloropropene	BDL	5	U
Trichloroethene	BDL	5	U
Dibromochloromethane	BDL	5	U
1,1,2-Trichloroethane	BDL	5	U
Benzene	BDL	5	U
Trans-1,3-Dichloropropene	BDL	5	U
Bromoform	BDL	5	U
4-Methyl-2-pentanone	BDL	10	U
2-Hexanone	BDL	10	U
Tetrachloroethene	BDL	5	U
1,1,2,2-Tetrachloroethane	BDL	5	U
Toluene	BDL	5	U
Chlorobenzene	BDL	5	U
Ethylbenzene	BDL	5	U
Styrene	BDL	5	U
Xylene (total)	BDL	5	U



WESTON-GULF COAST LABORATORIES, INC.

2417 Bond St., University Park, Illinois 60466

Phones: (312) 534-5200 (219) 885-7077 (815) 723-7533

April 19, 1990

Mr. Russell Frye
Roy F. Weston, Inc.
254 Welsh Pool Road
Lionville, PA 19353

Dear Mr. Frye:

Please find enclosed the analytical reports for the samples submitted to Weston/Gulf Coast Laboratories for analyses. They were identified as follows:

PROJECT NAME: Ecko Housewares

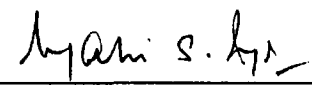
CLIENT ID	LAB ID#	SAMPLE DATE	DATE RECEIVED
STC-3	9004G696-001	03/30/90	04/23/90
STC-3 TCLP	9004G696-002	03/30/90	04/23/90
STC-3 TCLV	9004G696-003	03/30/90	04/23/90

If you have any questions, please contact Sheryl Johnson at our laboratories.

Sincerely,

WESTON/GULF COAST LABORATORIES


Donald Gipple
Project Director


Mani S. Iyer
Metals Unit Leader

kc

Enclosures



WESTON-GULF COAST LABORATORIES, INC.

2417 Bond St., University Park, Illinois 60466

Phones: (312) 534-5200 (219) 885-7077 (815) 723-7533

CASE NARRATIVE

VOA GC/MS

WESTON/Gulf Coast
Ecko Houseware
RFW# 9004G696

1. TCLP extraction and volatile analyses were performed within the recommended hold time.
2. All Method Blank target compounds were below Contract Required Quantitation Limits (CRQL). (** or five times the CRQL for the following compounds : methylene chloride, acetone, toluene, 2-butanone).
3. All LCS (Method Blank Spike) recoveries were within recommended limits.
4. Matrix spike analyses were performed on another sample extracted and analyzed with this set.
5. All surrogate recoveries in the volatile analyses were within USEPA QC limits.
6. Weston-Gulf Coast uses the following GC/MS systems which can be identified on all raw data by either the Instrument ID or the quantitation file ID :

ID#	Instrument	Quant ID File
GCL#1	Hewlett Packard 5970 MSD	ID_MS1
GCL#2	Hewlett Packard 5996	ID_MS2
GCL#3	Hewlett Packard 5996	ID_MS3
GCL#4	Hewlett Packard 5970 MSD	ID_MS4

All analyses were performed using Method SW846-8240 unless otherwise noted. The Internal Standard and Surrogate peaks are labeled by name.

7. All samples were analyzed as low level waters and therefore normal detection limits apply. A secondary dilution was necessary on sample 003 (1/10) in order to accurately quantitate the compound acetone.
8. Additonal QC for the TCLP process includes a reprep of sample 003 and a TCLP extaction blank (T-74).

Jeff A. Kaczinski GC/MS Unit Leader
Name/Title *JKH*

4-19-90
Date

DATA QUALIFIERS

- u - Indicates an inorganic compound was analyzed for but not detected.
- U - Indicates an organic compound was analyzed for but not detected.
- J - Indicates an estimated value for either a TIC or an analyte that meets the identification criteria but the result is less than the specified detection limit.
- B - Indicates the compound was found in the blank and the sample.
- T - Indicates the compound was found in the TCLP extraction blank and the sample.
- E - Concentrations exceed calibration range of the instrument.
- I - Indicates Interference.
- BS - Indicates matrix analyses were conducted on reagent grade water.
- BSD - Blank Spike Duplicate
- BDL - Below Detection Limit
- MS - Matrix Spike
- MSD - Matrix Spike Duplicate
- D - Indicates that surrogate/matrix spike recoveries were not obtained because the extract had to be diluted for analysis.
- DL - Indicates a secondary dilution
- NA - Not Applicable
- DF - Dilution factor
- X - Result is by calculation

NOTES:

Solid, sediment and sludge results are reported on a dry weight basis except when analyzed for Landfill disposal parameters (such as incineration or Illinois Green Sheet parameters). All other mg/kg results are reported on an "as received" basis.

Reporting limits are detection limits adjusted for sample size used, dilutions made, and in the case of dry weight results, the moisture content of the sample.

WESTON Analytics Use Only

Custody Transfer Record/Lab Work Request



Client _____

Work Order _____

Date Rec'd. _____ Date Due _____

RFW Contact _____

Client Contact/Phone _____

Refrigerator#

#/Type Container

Volume

Preservative

ANALYSES REQUESTED

WA Use Only
Lab ID

Client ID/Description

Matrix

Date Collected

Matrix:	W - Water	DS - Drum Solids	X - Other
S - Soil	O - Oil	DL - Drum Liquids	
SE - Sediment	A - Air	F - Fish	
SO - Solid	WI - Wipe	L - EP/TCLP Leachate	

Special Instructions:

**WESTON Analytics
Use Only**

Samples Were:

1 Shipped or Hand-Delivered

NOTES:

2 Ambient or Chilled
NOTES:

3 Received Broken/
Leaking (Improperly
Sealed)

Y N

NOTES:

4 Properly Preserved
Y N

NOTES:

5 Received Within
Holding Times

Y N

NOTES:

COC Tape Was:

1 Present on Outer Package	Y	N
-------------------------------	---	---

2 Unbroken on Outer Package	Y	N
-----------------------------	---	---

3 Present on Sample
Y N

4 Unbroken on Sample
NOTES: Y

COC Record Was:

1 Present Upon Receipt of Samples Y	N
--	---

Discrepancies Between
Sample Labels and COC
Record? Y N

NOTES:

RFW 21-21,001/A-12/88



WESTON-GULF COAST LABORATORIES, INC.
2417 Bond St., University Park, Illinois 60466
Phones: (708) 534-5200 (219) 885-7077 (815) 723-7533

ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Attn: Mr. Russell Frye

Date: Thursday April 19th, 1990

RE: STC-3 TCLP
Project # 2994-02-03-0019
Lab ID: 9004G696-002
Sample Date: 03/30/90
Date Received: 04/02/90

Inorganic Client Data Report

Parameters	Result	Units	Reporting Limit
Silver, Total	0.030	u mg/L	0.030
Arsenic, Total	0.016	u mg/L	0.016
Barium, Total	0.44	mg/L	0.050
Cadmium, Total	0.0052	mg/L	0.0040
Chromium, Total	0.098	mg/L	0.020
Mercury, Total	0.0010	u mg/L	0.0010
Lead, Total	0.050	u mg/L	0.050
Selenium, Total	0.029	mg/L	0.0080



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2417 Bond St., University Park, Illinois 60466
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ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Thursday April 19th, 1990

RE: STC-3 TCLV
Project # 2994-02-03-0019
Lab ID: 9004G696-003
Sample Date: 03/30/90
Date Received: 04/02/90
Units: UG/L

Attn: Mr. Russell Frye

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
Chloromethane	BDL	10	U
Bromomethane	BDL	10	U
Vinyl Chloride	BDL	10	U
Chloroethane	BDL	10	U
Methylene Chloride	7	5	T
Acetone	E	10	
Carbon Disulfide	BDL	5	U
1,1-Dichloroethene	BDL	5	U
1,1-Dichloroethane	BDL	5	U
1,2-Dichloroethene (total)	BDL	5	U
Chloroform	BDL	5	U
1,2-Dichloroethane	BDL	5	U
2-Butanone	BDL	10	U
1,1,1-Trichloroethane	BDL	5	U
Carbon Tetrachloride	BDL	5	U
Vinyl Acetate	BDL	10	U
Bromodichloromethane	BDL	5	U



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ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Thursday April 19th, 1990

Attn: Mr. Russell Frye

RE: STC-3 TCLV
Project # 2994-02-03-0019
Lab ID: 9004G696-003
Sample Date: 03/30/90
Date Received: 04/02/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
1,2-Dichloropropane	BDL	5	U
cis-1,3-Dichloropropene	BDL	5	U
Trichloroethene	BDL	5	U
Dibromochloromethane	BDL	5	U
1,1,2-Trichloroethane	BDL	5	U
Benzene	BDL	5	U
Trans-1,3-Dichloropropene	BDL	5	U
Bromoform	BDL	5	U
4-Methyl-2-pentanone	28	10	T
2-Hexanone	BDL	10	U
Tetrachloroethene	BDL	5	U
1,1,2,2-Tetrachloroethane	BDL	5	U
Toluene	BDL	5	U
Chlorobenzene	BDL	5	U
Ethylbenzene	BDL	5	U
Styrene	BDL	5	U
Xylene (total)	BDL	5	U



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ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Thursday April 19th, 1990

Attn: Mr. Russell Frye

RE: STC-3 TCLV
Project # 2994-02-03-0019
Lab ID: 9004G696-003
Sample Date: 03/30/90
Date Received: 04/02/90
Units: UG/L

Tentatively Identified Compounds

1 Volatile Compounds greater than 10% of the nearest
internal standard were tentatively identified by mass
spectral library search. This is exclusive of any target
compounds, surrogates or internal standards.

	Retention	Estimated
Volatile Compound	Time	Concentration
Unknown	26.02	8 J



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2417 Bond St., University Park, Illinois 60466
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ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Thursday April 19th, 1990

Attn: Mr. Russell Frye

RE: STC-3 TCLV
Project # 2994-02-03-0019
Lab ID: 9004G696-003 DL
Sample Date: 03/30/90
Date Received: 04/02/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
Acetone	2200	100	



WESTON-GULF COAST LABORATORIES, INC.

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ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Thursday April 19th, 1990

Attn: Mr. Russell Frye

RE: STC-3 TCLV

Project # 2994-02-03-0019

Lab ID: 9004G696-003 REPREP

Sample Date: 03/30/90

Date Received: 04/02/90

Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
Chloromethane	BDL	10	U
Bromomethane	BDL	10	U
Vinyl Chloride	BDL	10	U
Chloroethane	BDL	10	U
Methylene Chloride	14	5	T
Acetone	E	10	
Carbon Disulfide	BDL	5	U
1,1-Dichloroethene	BDL	5	U
1,1-Dichloroethane	BDL	5	U
1,2-Dichloroethene (total)	BDL	5	U
Chloroform	BDL	5	U
1,2-Dichloroethane	BDL	5	U
2-Butanone	22	10	
1,1,1-Trichloroethane	BDL	5	U
Carbon Tetrachloride	BDL	5	U
Vinyl Acetate	BDL	10	U
Bromodichloromethane	BDL	5	U



WESTON-GULF COAST LABORATORIES, INC.

2417 Bond St., University Park, Illinois 60466

Phones: (708) 534-5200 (219) 885-7077 (815) 723-7533

ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Thursday April 19th, 1990

Attn: Mr. Russell Frye

RE: STC-3 TCLV
Project # 2994-02-03-0019
Lab ID: 9004G696-003 REPREP
Sample Date: 03/30/90
Date Received: 04/02/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
1,2-Dichloropropane	BDL	5	U
cis-1,3-Dichloropropene	BDL	5	U
Trichloroethene	BDL	5	U
Dibromochloromethane	BDL	5	U
1,1,2-Trichloroethane	BDL	5	U
Benzene	BDL	5	U
Trans-1,3-Dichloropropene	BDL	5	U
Bromoform	BDL	5	U
4-Methyl-2-pentanone	34	10	T
2-Hexanone	BDL	10	U
Tetrachloroethene	BDL	5	U
1,1,2,2-Tetrachloroethane	BDL	5	U
Toluene	BDL	5	U
Chlorobenzene	BDL	5	U
Ethylbenzene	BDL	5	U
Styrene	BDL	5	U
Xylene (total)	BDL	5	U



WESTON-GULF COAST LABORATORIES, INC.

2417 Bond St., University Park, Illinois 60466

Phones: (312) 534-5200 (219) 885-7077 (315) 723-7533

May 3, 1990

Mr. Russell Frye
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Dear Mr. Frye:

Please find enclosed the analytical reports for the samples submitted to Weston/Gulf Coast Laboratories for analyses. They were identified as follows:

Project: Ecko Houseware

CLIENT ID	LAB ID#	SAMPLE DATE	DATE RECEIVED
WSTN 1 TCLP	9004G874-002	04/06/90	04/10/90
WSTN 1 TCLV	9004G874-003	04/06/90	04/10/90
WSTN 2 TCLP	9004G874-005	04/06/90	04/10/90
WSTN 1 TCLV	9004G874-006	04/06/90	04/10/90

If you have any questions, please contact Jodie Bracken at our laboratories.

Sincerely,

WESTON/GULF COAST LABORATORIES

John Boudreau
John Boudreau
Laboratory Manager

Jeff A. Kaczinski
Jeff A. Kaczinski
GC/MS Unit Leader

Michael J. Healy
Michael J. Healy
Project Manager

Mani S. Iyer
Mani S. Iyer
Metals Unit Leader

jvb

Enclosures

WESTON Analytics Use Only

Custody Transfer Record/Lab Work Request



Client _____

Work Order _____

Date Rec'd. _____ Date Due _____

RFW Contact _____

Client Contact/Phone _____

Refrigerator#

#/Type Container

Volume

Preservative

ANALYSES REQUESTED

WA Use Only
Lab ID

Client ID/Description

Matrix

Date Collected

Matrix:	W - Water	DS - Drum Solids
S - Soil	O - Oil	DL - Drum Liquids
SE - Sediment	A - Air	F - Fish
SO - Solid	WI - Wipe	X - Other

Special Instructions:

[illegible]

WESTON Analytics
Use Only

Samples Were:

1 Shipped or Hand-Delivered

NOTES:

2 Ambient or Chilled

NOTES:

3 Received Broken/
Leaking (Improperly
Sealed)

Y N

NOTES:

4 Properly Preserved

Y M

NOTES:

5 Received Within Holding Times

Y

NOTES:

COC Tape Was:

1 Present on Outer Package	Y	N
----------------------------	---	---

2 Unbroken on Outer Package	Y	N
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3 Present on Sample
Y N

4 Unbroken on Sample
NOTES: Y N

COC Record Was:

1 Present Upon Receipt
of Samples Y N

Discrepancies Between Sample Labels and COC Record?		
	Y	N
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NOTES:



WESTON-GULF COAST LABORATORIES, INC.

2417 Bond St., University Park, Illinois 60466

Phones: (312) 534-5200 (219) 885-7077 (815) 723-7530

CASE NARRATIVE

METALS

WESTON/Gulf Coast
Ecko Housewares
RFW Batch #: 9004G874

The samples were analyzed as follows:

ICP - Ag, Ba, Cd, Cr, Pb
Hydride - As, Se
Cold Vapor - Hg

Preparation Blank (PB)

All PB results were below the instrument reporting limits.

Laboratory Control Sample (LCS)

All LCS results met the required QC limits.

Duplicate

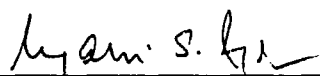
All the duplicate results were within the reporting limits.

Spike

All spike results were within the required QC limits except:

9004G874-002 As

Original Spike Recovery 64.8%
Duplicate Spike Recovery 68.0%



Mani S. Iyer
Metals Unit Leader

5/31/90

Date



WESTON-GULF COAST LABORATORIES, INC.

2417 Bond St., University Park, Illinois 60486

Phones: (312) 534-5200 (219) 885-7077 (815) 723-7530

CASE NARRATIVE

VOA, BNA GC/MS

WESTON/Gulf Coast
Ecko Houseware
RFW# 9004G874

VOA DATA:

1. All initial analyses were performed within the recommended hold time.
2. All Method Blank target compounds were below Contract Required Quantitation Limits (CRQL). (** or five times the CRQL for the following compounds: methylene chloride, acetone, toluene, 2-butanone).
3. All LCS (Method Blank Spike) recoveries were within recommended limits.
4. Matrix spike analyses were conducted on another sample that was analyzed with this set.
5. All surrogate recoveries in the volatile analyses were within USEPA QC limits.
6. Weston-Gulf Coast uses the following GC/MS systems which can be identified on all raw data by either the Instrument ID or the quantitation file ID:

ID #	Instrument	Quant ID File
GCL#1	Hewlett Packard 5970 MSD	ID_MS1
GCL#2	Hewlett Packard 5996	ID_MS2
GCL#3	Hewlett Packard 5996	ID_MS3
GCL#4	Hewlett Packard 5970 MSD	ID_MS4

All analyses were performed using Method SW846-8240 unless otherwise noted. The Internal Standard and Surrogate peaks are labeled by name.

7. All of the samples were analyzed as low level waters following an initial TCLP extraction procedure and therefore normal detection limits apply.

App. Razinski / GC/MS Unit Leader
Name/Title

4-18-90
Date

DATA QUALIFIERS

- u - Indicates an inorganic compound was analyzed for but not detected.
- U - Indicates an organic compound was analyzed for but not detected.
- J - Indicates an estimated value for either a TIC or an analyte that meets the identification criteria but the result is less than the specified detection limit.
- B - Indicates the compound was found in the blank and the sample.
- T - Indicates the compound was found in the TCLP extraction blank and the sample.
- E - Concentrations exceed calibration range of the instrument.
- I - Indicates Interference.
- BS - Indicates matrix analyses were conducted on reagent grade water.
- BSD - Blank Spike Duplicate
- BDL - Below Detection Limit
- MS - Matrix Spike
- MSD - Matrix Spike Duplicate
- D - Indicates that surrogate/matrix spike recoveries were not obtained because the extract had to be diluted for analysis.
- DL - Indicates a secondary dilution
- NA - Not Applicable
- DF - Dilution factor
- X - Result is by calculation

NOTES:

Solid, sediment and sludge results are reported on a dry weight basis except when analyzed for Landfill disposal parameters (such as incineration or Illinois Green Sheet parameters). All other mg/kg results are reported on an "as received" basis.

Reporting limits are detection limits adjusted for sample size used, dilutions made, and in the case of dry weight results, the moisture content of the sample.



WESTON-GULF COAST LABORATORIES, INC.
2417 Bond St., University Park, Illinois 60466
Phones: (708) 534-5200 (219) 885-7077 (815) 723-7533

ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Attn: Mr. Russell Frye

Date: Thursday May 3rd, 1990

RE: WSTN 1 TCLP
Project # 2994-02-03-0019
Lab ID: 9004G874-002
Sample Date: 04/06/90
Date Received: 04/10/90

Inorganic Client Data Report

Parameters	Result	Units	Reporting Limit
Silver, Total	0.030 u	mg/L	0.030
Arsenic, Total	0.016 u	mg/L	0.016
Barium, Total	0.43	mg/L	0.050
Cadmium, Total	6.6	mg/L	0.0040
Chromium, Total	0.020 u	mg/L	0.020
Mercury, Total	0.0010 u	mg/L	0.0010
Lead, Total	0.050 u	mg/L	0.050
Selenium, Total	0.039	mg/L	0.0080



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2417 Bond St., University Park, Illinois 60466
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ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Tuesday April 17th, 1990

Attn: Mr. Russell Frye

RE: WSTN 1 TCLV
Project # 2994-02-03-0019
Lab ID: 9004G874-003
Sample Date: 04/06/90
Date Received: 04/10/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
Chloromethane	BDL	10	U
Bromomethane	BDL	10	U
Vinyl Chloride	BDL	10	U
Chloroethane	BDL	10	U
Methylene Chloride	10	5	T
Acetone	63	10	T
Carbon Disulfide	7	5	
1,1-Dichloroethene	BDL	5	U
1,1-Dichloroethane	BDL	5	U
1,2-Dichloroethene (total)	BDL	5	U
Chloroform	1	5	JT
1,2-Dichloroethane	BDL	5	U
2-Butanone	BDL	10	U
1,1,1-Trichloroethane	BDL	5	U
Carbon Tetrachloride	BDL	5	U
Vinyl Acetate	BDL	10	U
Bromodichloromethane	BDL	5	U



WESTON-GULF COAST LABORATORIES, INC.
2417 Bond St., University Park, Illinois 60466
Phones: (708) 534-5200 (219) 885-7077 (815) 723-7533

ANALYTICAL REPORT

To: Ecco Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Tuesday April 17th, 1990

Attn: Mr. Russell Frye

RE: WSTN 1 TCLV
Project # 2994-02-03-0019
Lab ID: 90046874-003
Sample Date: 04/06/90
Date Received: 04/10/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
1,2-Dichloropropane	BDL	5	U
cis-1,3-Dichloropropene	BDL	5	U
Trichloroethene	BDL	5	U
Dibromochloromethane	BDL	5	U
1,1,2-Trichloroethane	BDL	5	U
Benzene	BDL	5	U
Trans-1,3-Dichloropropene	BDL	5	U
Bromoform	BDL	5	U
4-Methyl-2-pentanone	15	10	
2-Hexanone	BDL	10	U
Tetrachloroethene	BDL	5	U
1,1,2,2-Tetrachloroethane	BDL	5	U
Toluene	BDL	5	U
Chlorobenzene	3	5	JT
Ethylbenzene	BDL	5	U
Styrene	BDL	5	U
Xylene (total)	BDL	5	U



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ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Tuesday April 17th, 1990

Attn: Mr. Russell Frye

RE: WSTN 1 TCLV
Project # 2994-02-03-0019
Lab ID: 90046874-003
Sample Date: 04/06/90
Date Received: 04/10/90
Units: UG/L

Tentatively Identified Compounds

1 Volatile Compounds greater than 10% of the nearest
internal standard were tentatively identified by mass
spectral library search. This is exclusive of any target
compounds, surrogates or internal standards.

	Retention	Estimated
Volatile Compound	Time	Concentration
ACID ESTER C7H14O2	26.03	100 J



WESTON-GULF COAST LABORATORIES, INC.
2417 Bond St., University Park, Illinois 60466
Phones: (708) 534-5200 (219) 885-7077 (815) 723-7533

ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Attn: Mr. Russell Frye

Date: Thursday May 3rd, 1990

RE: WSTN 2 TCLP
Project # 2994-02-03-0019
Lab ID: 9004G874-005
Sample Date: 04/06/90
Date Received: 04/10/90

Inorganic Client Data Report

Parameters	Result	Units	Reporting Limit
Silver, Total	0.030 u	mg/L	0.030
Arsenic, Total	0.016 u	mg/L	0.016
Barium, Total	0.68	mg/L	0.050
Cadmium, Total	1.7	mg/L	0.0040
Chromium, Total	0.14	mg/L	0.020
Mercury, Total	0.0010 u	mg/L	0.0010
Lead, Total	0.050 u	mg/L	0.050
Selenium, Total	0.062	mg/L	0.0080



WESTON-GULF COAST LABORATORIES, INC.
2417 Bond St., University Park, Illinois 60466
Phones: (708) 534-5200 (219) 885-7077 (815) 723-7533

ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Tuesday April 17th, 1990

Attn: Mr. Russell Frye

RE: WSTN 2 TCLV
Project # 2994-02-03-0019
Lab ID: 9004G874-006
Sample Date: 04/06/90
Date Received: 04/10/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
Chloromethane	BDL	10	U
Bromomethane	BDL	10	U
Vinyl Chloride	BDL	10	U
Chloroethane	BDL	10	U
Methylene Chloride	16	5	T
Acetone	110	10	T
Carbon Disulfide	BDL	5	U
1,1-Dichloroethene	BDL	5	U
1,1-Dichloroethane	BDL	5	U
1,2-Dichloroethene (total)	BDL	5	U
Chloroform	1	5	JT
1,2-Dichloroethane	BDL	5	U
2-Butanone	BDL	10	U
1,1,1-Trichloroethane	BDL	5	U
Carbon Tetrachloride	BDL	5	U
Vinyl Acetate	BDL	10	U
Bromodichloromethane	BDL	5	U



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ANALYTICAL REPORT

To: Ecco Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Tuesday April 17th, 1990

Attn: Mr. Russell Frye

RE: WSTN 2 TCLV
Project # 2994-02-03-0019
Lab ID: 9004G874-006
Sample Date: 04/06/90
Date Received: 04/10/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
1,2-Dichloropropane	BDL	5	U
cis-1,3-Dichloropropene	BDL	5	U
Trichloroethene	BDL	5	U
Dibromochloromethane	BDL	5	U
1,1,2-Trichloroethane	BDL	5	U
Benzene	BDL	5	U
Trans-1,3-Dichloropropene	BDL	5	U
Bromoform	BDL	5	U
4-Methyl-2-pentanone	16	10	
2-Hexanone	BDL	10	U
Tetrachloroethene	1	5	J
1,1,2,2-Tetrachloroethane	BDL	5	U
Toluene	BDL	5	U
Chlorobenzene	3	5	JT
Ethylbenzene	BDL	5	U
Styrene	BDL	5	U
Xylene (total)	BDL	5	U



WESTON-GULF COAST LABORATORIES, INC.
2417 Bond St., University Park, Illinois 60466
Phones: (708) 534-5200 (219) 885-7077 (815) 723-7533

ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Tuesday April 17th, 1990

Attn: Mr. Russell Frye

RE: WSTN 2 TCLV
Project # 2994-02-03-0019
Lab ID: 90046874-006
Sample Date: 04/06/90
Date Received: 04/10/90
Units: UG/L

Tentatively Identified Compounds

No Volatile Compounds greater than 10% of the nearest
internal standard were tentatively identified by mass
spectral library search. This is exclusive of any target
compounds, surrogates or internal standards.



WESTON-GULF COAST LABORATORIES, INC.
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ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
Lionville, PA 19353

Date: Wednesday April 18th, 1990

Attn: Mr. Russell Frye

RE: WSTN 2 TCLV
Project # 2994-02-03-0019
Lab ID: 9004G874-006 REPREP
Sample Date: 04/06/90
Date Received: 04/10/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
Chloromethane	BDL	10	U
Bromomethane	BDL	10	U
Vinyl Chloride	BDL	10	U
Chloroethane	BDL	10	U
Methylene Chloride	14	5	T
Acetone	110	10	T
Carbon Disulfide	BDL	5	U
1,1-Dichloroethene	BDL	5	U
1,1-Dichloroethane	BDL	5	U
1,2-Dichloroethene (total)	BDL	5	U
Chloroform	1	5	JT
1,2-Dichloroethane	BDL	5	U
2-Butanone	BDL	10	U
1,1,1-Trichloroethane	BDL	5	U
Carbon Tetrachloride	BDL	5	U
Vinyl Acetate	BDL	10	U
Bromodichloromethane	BDL	5	U



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ANALYTICAL REPORT

To: Ecko Housware
Roy F. Weston, Incorporated
254 Welsh Pool Road
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Date: Wednesday April 18th, 1990

Attn: Mr. Russell Frye

RE: WSTN 2 TCLV
Project # 2994-02-03-0019
Lab ID: 9004G874-006 REPREP
Sample Date: 04/06/90
Date Received: 04/10/90
Units: UG/L

VOLATILES BY GC/MS, HSL LIST

Volatile Compound	Result	Detection Limit	Flag
1,2-Dichloropropane	BDL	5	U
cis-1,3-Dichloropropene	BDL	5	U
Trichloroethene	BDL	5	U
Dibromochloromethane	BDL	5	U
1,1,2-Trichloroethane	BDL	5	U
Benzene	BDL	5	U
Trans-1,3-Dichloropropene	BDL	5	U
Bromoform	BDL	5	U
4-Methyl-2-pentanone	21	10	
2-Hexanone	BDL	10	U
Tetrachloroethene	4	5	J
1,1,2,2-Tetrachloroethane	BDL	5	U
Toluene	BDL	5	U
Chlorobenzene	3	5	JT
Ethylbenzene	BDL	5	U
Styrene	BDL	5	U
Xylene (total)	BDL	5	U